حمل الآن

مجانا وحصريا

امتحانات رقم (1)

الترم الثانى

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1 Cairo Governorate

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The set of zeroes of the function f where $f(x) = x - 5$ in $\mathbb{R}$ is ....

(a) $\varnothing$ (b) $\{zero\}$ (c) $\{-5\}$ (d) $\{5\}$

2 If $x - y = 2$, $x^2 - y^2 = 12$, then $x + y =$ ....

(a) 6 (b) 10 (c) 14 (d) 24

3 The solution set of the equation $x^3 = 8$ in $\mathbb{R}$ is ....

(a) $\varnothing$ (b) $\{-2\}$ (c) $\{2\}$ (d) $\{-2 , 2\}$

4 If S is the sample space of a random experiment , $A \subset S$, $\grave{A}$ is the complementary event of the event A , then $P(A) + P(\grave{A}) =$ ....

(a) zero (b) 0.5 (c) 1 (d) 2

5 If a is a rational number does not equal zero , $n \in \mathbb{Z}^+$, then $a^{-n} =$ ....

(a) $\frac{1}{a^n}$ (b) $-\frac{1}{a^n}$ (c) $-a^n$ (d) n a

6 The equation : $a x^2 + b x + c = 0$ (where a , b , c are real numbers) , is a second degree equation if $a \neq$ ....

(a) -1 (b) zero (c) 1 (d) 2

2 [a] By using the general formula find in $\mathbb{R}$ the solution set of the equation :

$x^2 - 3x + 1 = 0$ to the nearest one decimal place

[b] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{x+1}{x^2 - 2x - 3} \times \frac{x^2 - 9}{x + 3}$$

3 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x + y = 6$, $x - 2y = 3$

[b] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{x - 2}{x^2 - 4} + \frac{x^2 - 2x + 4}{x^3 + 8}$$

4 [a] If A , B are two mutually exclusive events from the sample space of a random experiment and P (A) = 0.3 , P (B) = 0.4 , **find :**

1 $P(A \cup B)$ 2 $P(A - B)$

[b] If $n(x) = \dfrac{x^2 - 1}{x^2 + x - 2}$, find $n^{-1}(x)$ in the simplest form showing the domain of n^{-1}

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5 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$x - y = 0$, $x^2 + y = 2$

[b] **Find n (x) in the simplest form , showing the domain where :**

$n(x) = \dfrac{x^2}{x - 1} + \dfrac{x}{1 - x}$

2 Giza Governorate

Answer the following questions :

1 **Choose the correct answer :**

1 The domain of the function $f : f(x) = \dfrac{x + 2}{x - 1}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\mathbb{R} - \{1 , -2\}$

2 If (k , 3) is a solution of the equation $2x - y = 7$, then k = ...

(a) 3 (b) 10 (c) 5 (d) zero

3 Number of solutions of the two equations : $x + y = 3$ and $x + y = 2$ together in $\mathbb{R} \times \mathbb{R}$ is = ...

(a) zero (b) 1 (c) 2 (d) 3

4 If A , B are two events of the sample space S of a random experiment , and $A \subset B$, then P (A – B) = ...

(a) P (A) (b) P (B) (c) $\varnothing$ (d) zero

5 If $x^2 + kx + 9$ is a perfect square , then k = ...

(a) ± 9 (b) ± 6 (c) ± 1 (d) ± 4

6 Half of the number 2^{10} = ...

(a) 2^5 (b) 5^2 (c) 2^9 (d) 2^7

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2 [a] **Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of two equations :**

$x + 2y = 4$, $3x - y = 5$

[b] If $n_1(x) = \dfrac{x^2 + 2x}{x^2 - 4}$, $n_2(x) = \dfrac{x(x - 1)}{x^2 - 3x + 2}$

, is $n_1 = n_2$? and find the common domain of them.

3 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $y - x = 2$, $x y = 15$

[b] **Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{x^2 + 4x + 3}{x^3 - 27} \div \frac{x + 3}{x^2 + 3x + 9}$$

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4 [a] **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

$x^2 - 5x + 3 = 0$ "approximating the results to nearest one decimal place".

[b] **Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{x^2 - x}{x^2 - 1} + \frac{x + 5}{x^2 + 6x + 5}$$

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5 [a] If A , B are two events of the sample space S of a random experiment , P (A) = 0.7 , P (B) = 0.5 and P (A $\cap$ B) = 0.3 , **then find the following :**

1 P (A $\cup$ B) 2 P ($\grave{A}$)

[b] If $n(x) = \frac{x^2 - 2x}{x^2 - 5x + 6}$, then find $n^{-1}(x)$ in the simplest form , showing the domain of n^{-1}

3 Alexandria Governorate

Answer the following questions : *(Calculator is allowed)*

1 **Choose the correct answer from those given :**

1 A regular dice is rolled once , then the probability of getting an even number equals ....

(a) zero (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 1

2 $\sqrt{25 - 9} = 5 -$ ....

(a) 4 (b) 3 (c) 1 (d) – 1

3 If $y^3 = 8$, then y = ...

(a) 2 (b) 8 (c) 512 (d) $\frac{1}{2}$

4 If the two equations : $x + 4y = 7$, $3x + ky = 21$ have an infinit number of solutions in $\mathbb{R} \times \mathbb{R}$, then k = ...

(a) 7 (b) 14 (c) 21 (d) 12

5 The set of zeroes of the function $f : f(x) = (x - 1)^2 (x + 2)$ is ....

(a) {– 1 , 2} (b) {1 , – 2} (c) {– 1 , – 2} (d) {1 , 2}

6 A two-digit number , its units digit is x and its tens digit is y , then this number is ....

(a) $10xy$ (b) $x + y$ (c) $y + 10x$ (d) $x + 10y$

2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$3x + y = 3$, $2x - y = 7$

[b] If $n_1(x) = \frac{2x^3 + 6x}{(x-1)(x^2+3)}$, $n_2(x) = \frac{2x}{x-1}$, **prove that :** $n_1 = n_2$

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3 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$y - x = 2$, $x^2 + xy - 4 = 0$

[b] If $n(x) = \frac{x}{x^2 + 2x} + \frac{x-2}{x^2-4}$, find $n(x)$ in the simplest form , showing the domain

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4 [a] **Solve the following equation in $\mathbb{R}$ using the general formula , (rounding the result to one decimal place) :** $x^2 + 3x - 3 = 0$

[b] **Find $n(x)$ in the simplest form , showing the domain :**

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \div \frac{x^2 + 2x + 4}{x + 3}$$

---

5 [a] If A and B are two events of the sample space of a random experiment and $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, **find** $P(A \cup B)$ if :

1. $P(A \cap B) = \frac{1}{6}$
2. A and B mutually exclusive events

[b] If $n(x) = \frac{x+3}{x-5}$, **find :**

1. $n^{-1}(x)$, showing the domain.
2. $n^{-1}(4)$

4 El-Kalyoubia Governorate

Answer the following questions :

1 **Choose the correct answer from the given ones :**

1. If $(5^x , 3) = (25 , y)$, then $x + y =$ ....

   (a) 2 (b) 3 (c) 5 (d) 6

2. The point of intersection of two straight lines $x + 3 = 0$, $y - 5 = 0$ lies in the .... quadrant.

   (a) first (b) second (c) third (d) fourth

3. If $a^2 - b^2 = 35$, $a - b = 5$, then $a + b =$ ....

   (a) 7 (b) 4 (c) 3 (d) 1

4 The set of zeroes of the function $f : f(X) = X^2 + 1$ in $\mathbb{R}$ is ....

(a) $\{1\}$ (b) $\{1, -1\}$ (c) $\mathbb{R}$ (d) $\varnothing$

5 If $ab = 1$, $bc = 4$, $ac = 9$, then $abc =$ .... where $a \in \mathbb{R}_+$, $b \in \mathbb{R}_+$, $c \in \mathbb{R}_+$

(a) 2 (b) 4 (c) 6 (d) 8

6 If A and B are two mutually exclusive events of a sample space of a random experiment , then $P(A \cap B) =$ ....

(a) $\varnothing$ (b) zero (c) P (A) (d) P (B)

---

2 [a] Find algebraically the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$X + y - 5 = 0$, $X - y = 1$

[b] Find n (X) in the simplest form , showing the domain where :

$$n(X) = \frac{X - 3}{X^2 - 7X + 12} - \frac{4X}{X^2 - 4X}$$

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3 [a] Find in $\mathbb{R}$ by using the general formula the solution set of the equation :

$X^2 - 6X + 4 = 0$ "approximating the result to the nearest three decimal places"

[b] If $n_1(X) = \frac{X}{X^2 - 4}$, $n_2(X) = \frac{2X}{2X^2 - 8}$ **, prove that :** $n_1 = n_2$

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4 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$y = 3 + X$, $X^2 - 2X + 3y = 15$

[b] If the domain of the function $n : n(X) = \frac{X - 1}{X^2 - aX + 9}$ is $\mathbb{R} - \{3\}$, find the value of a , showing the steps of solution

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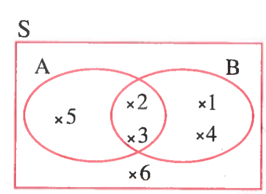
5 [a] Find n (X) in the simplest form , showing the domain of n :

$$n(X) = \frac{X^2 - X - 2}{X^2 - 1} \div \frac{3X - 15}{X^2 - 6X + 5}$$

[b] In the opposite figure :



If A and B are two events in the sample space of a random experiment , **find :**

1 P (A – B)

2 The probability of non-occurrence of the event A

5 El-Sharkia Governorate

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The simplest form of the function $f : f(X) = \frac{X-2}{2-X}$ where $X \neq 2$ is ....

(a) 1 (b) -1 (c) 2 (d) -2

2 If $n_1(X) = \frac{1}{X-3}$, $n_2(X) = \frac{X}{X-3}$, $n(X) = n_1(X) + n_2(X)$, then the domain of n^{-1} is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{3\}$ (c) $\mathbb{R}$ (d) $\mathbb{R} - \{-1 , 3\}$

3 If $2^X = 3$, then $\left(\frac{1}{2}\right)^X =$ ....

(a) zero (b) 1 (c) $\frac{1}{3}$ (d) 3

4 If the two equations : $X - k\,y = \ell$, $2X - 4y = 1$ have infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then $\ell \times k =$ ....

(a) 2 (b) 1 (c) 8 (d) 4

5 If the vertex of the curve of the function $f : f(X) = a X^2 + b X + c$ is $(1 , 4)$ where $a > 0$, then the number of solutions of the equation $f(X) = 0$ is ....

(a) zero. (b) 1 (c) 2 (d) infinite.

6 If A , B are two mutually exclusive events of the sample space of a random experiment where $P(A) = 0.3$, $P(A \cup B) = 0.6$, then $P(\acute{B}) =$ ....

(a) 0.3 (b) 0.6 (c) 0.7 (d) 0.9

2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$2y = X - 5$, $4X + y = 2$

[b] **Find $f(X)$ in simplest form , showing the domain :**

where $f(X) = \frac{X^2 - 6X + 9}{X^3 - 27} \div \frac{X^2 - 3X}{X^2 + 3X + 9}$, then find $f(3)$ if possible.

3 [a] **Find by using the general rule the solution set in $\mathbb{R}$ of the equation :**

$X^2 - 2X = 4$ "approximating the result to nearest two decimal places"

[b] If $n_1(X) = \frac{X^2 - X}{X^3 - 2X^2}$, $n_2(X) = \frac{X^2 - 3X + 2}{X^3 - 4X^2 + 4X}$, **prove that :** $n_1 = n_2$

4 **[a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$x + y = 2 \quad , \quad y + x = 2\,x\,y$

[b] Find $f(x)$ in the simplest form , showing the domain of f :

$$f(x) = \frac{2x - 6}{x^2 - 9} - \frac{8}{3 - x^2 - 2x}$$

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5 **[a]** A box contains 15 balls , 6 balls are red numbered from 1 to 6 and 9 green balls are numbered from 7 to 15 one ball was drawn randomly from the box.

, find the probability of the following events :

1. The drawn ball is red or carries an odd number.
2. The drawn ball is green and carries an even number.

[b] If the domain of $n(x) = \frac{\ell}{x} - \frac{8}{x + m}$ is $\mathbb{R} - \{0 , -1\}$ and $n(-3) = 1$

, find the value of each of : m , ℓ

6 El-Monofia Governorate

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from the given ones :**

1. If $\sqrt{x} = 2$, then $\frac{1}{2}\,x =$ ....

   (a) 1 (b) 2 (c) 3 (d) 4

2. If AB = 2 , $AB^2 = 18$, then B = ...

   (a) – 3 (b) ± 3 (c) 3 (d) 9

3. $[2 , 5]$ is the solution set of the inequality .... in $\mathbb{R}$

   (a) $1 \le x - 1 < 4$ (b) $1 < x - 1 \le 4$ (c) $1 \le x - 1 \le 4$ (d) $1 < x - 1 < 4$

4. If the two straight lines which represent the two equations : $x + 3y = 4$, $2x + ky = 11$ are parallel , then k = ...

   (a) 6 (b) 1 (c) – 1 (d) – 6

5. The set of zeroes of f where $f(x) = \frac{2 - x}{7}$ is ....

   (a) $\{7\}$ (b) $\{2 , 7\}$ (c) $\{2\}$ (d) $\varnothing$

6. If a fair die is rolled once , then the probability of getting an odd number equals ....

   (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 3

2 [a] **Find the solution set in $\mathbb{R} \times \mathbb{R}$ for the following two equations :**

$3x + 2y = 4 \quad , \quad x - 3y = 5$

[b] **Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} + \frac{x^2 + x - 2}{x^2 - 4}$$

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3 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations :**

$y = x - 3 \quad , \quad x^2 + y^2 = 17$

[b] If $n_1(x) = \frac{2x}{2x + 4}$ and $n_2(x) = \frac{x^2 + 2x}{x^2 + 4x + 4}$ **, then prove that :** $n_1 = n_2$

---

4 [a] **By using the general formula find in $\mathbb{R}$ the solution set of the equation :**

$x^2 - 2x - 4 = 0$ "rounding the result to the nearest two decimal places"

[b] **Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{3x^2 - 6x}{x^2 - 4} \times \frac{x^2 + 3x + 2}{x^2 + x}$$

---

5 [a] If A and B are two events from the sample space S of a random expriment , where $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$ **, then find :**

1 $P(\grave{A})$ 2 $P(A \cup B)$ 3 $P(B - A)$

[b] If $n(x) = \frac{x + 2}{x^2 - x - 6}$

1 Find $n^{-1}(x)$ in the simplest form and identify the domain of n^{-1}

2 If $n^{-1}(x) = 2$, then find the value of x ?

7 El-Gharbia Governorate

Answer the following questions :

1 **Choose the correct answer from the given ones :**

1 If there is an infinite number of solutions of the two equations :
$x + 3y = 7$, $2x + ky = 14$ in $\mathbb{R} \times \mathbb{R}$, then k = ...

(a) 1 (b) 2 (c) 3 (d) 6

2 If $n(x) = \frac{x - 3}{x + 2}$, then $n^{-1}(3)$ is ....

(a) zero (b) 3 (c) -2 (d) undefined

3 If $6^{x} = 12$, then $6^{x+1} =$ ....

(a) 16 (b) 13 (c) 72 (d) 27

4 If the probability of the occurance of an event is 25% , then the probability that the event does not occur equals ....

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 1

5 If x is a negative number , then the greatest number of the following is ....

(a) $9 + x$ (b) $9 - x$ (c) $9x$ (d) $\frac{9}{x}$

6 If $\sqrt{100 - 36} = 10 - A$, then $A =$ ....

(a) 2 (b) 4 (c) 6 (d) 8

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2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$x + y = 10$, $x^2 - y^2 = 40$

[b] If A and B are two events in the sample space of a random experiment , where $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, **then find :**

1 $P(A \cup B)$ 2 $P(B - A)$

---

3 [a] If the domain of the function n where $n(x) = \frac{b}{x} + \frac{9}{x + a}$ is $\mathbb{R} - \{0 , 4\}$, $n(5) = 2$, then find the values of a and b

[b] If $n_1(x) = \frac{x^2 - 4}{x^2 + x - 6}$, $n_2(x) = \frac{x^3 - x^2 - 6x}{x^3 - 9x}$, then prove that $n_1(x) = n_2(x)$ for all values of x which belong to the common domain and find this domain.

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4 [a] If $n(x) = \frac{x^2 - 9}{2x^2 + 3x} \div \frac{2x^3 + 3x - 9}{4x^2 - 9}$, then find $n(x)$ in the simplest form , showing the domain.

[b] **Find in $\mathbb{R}$ the solution set of the equation :** $3x^2 = 5x - 1$, "approximating the results to the nearest two decimal places".

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5 [a] If $n(x) = \frac{3x - 4}{x^2 - 5x + 6} + \frac{2x + 6}{x^2 + x - 6}$, then find $n(x)$ in the simplest form showing the domain of n

[b] **Find graphically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$y = 2x - 3$, $x + 2y = 4$

8 El-Dakahlia Governorate

Answer the following questions : *(Calculator is permitted)*

1 [a] Choose the correct answer :

1. If a regular die is rolled once , the the probability of appearing a number less than 3 equal ....
   (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{1}{6}$
2. If X is a negative number , then the greatest number of the following numbers is ....
   (a) $5 - X$ (b) $5 + X$ (c) $5X$ (d) $\frac{5}{X}$
3. If $ab = 12$, $bc = 20$, $ac = 15$, $a \in \mathbb{R}_+$, $b \in \mathbb{R}_+$, $c \in \mathbb{R}_+$, then abc = ...
   (a) 36 (b) 60 (c) 360 (d) 3600

[b] By using the general formula , find in $\mathbb{R}$ the solution set of the following equation :

$1 - \frac{2}{X} = \frac{2}{X^2}$ where $X \neq 0$ "approximating the result to the nearest three decimal places"

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2 [a] Choose the correct answer :

1. If the solution set of the equation : $X^2 - aX + 4 = 0$ in $\mathbb{R}$ is $\varnothing$, then a may be equal to ....
   (a) -5 (b) zero (c) 4 (d) 5
2. If $17X + 51y = 102$, then $9X + 27y =$ ....
   (a) 54 (b) 36 (c) 34 (d) 18
3. The set of zeroes of the function $f : f(X) = \frac{X^2 - X - 2}{X^2 + 4}$ is ....
   (a) $\{-2 , 2\}$ (b) $\{-2 , -1\}$ (c) $\{-1 , 2\}$ (d) $\{-1 , 1\}$

[b] If n_1 , n_2 are two algebraic fractions where :

$n_1(X) = \frac{X^2 - 4}{X^2 + X - 6}$, $n_2(X) = \frac{X^3 - X^2 - 6X}{X^3 - 9X}$

Prove that : $n_1(X) = n_2(X)$ for all values of X which belong to the common domain and find this domain.

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3 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$2|X| - |y| = 2$, $3|X| + |y| = 3$

[b] Find n (X) in the simplest from , showing the domain where :

$n(X) = \frac{X^2 - 2X - 15}{X^2 - 9} \div \frac{2X - 10}{X^2 - 6X + 9}$

4 [a] **Find n (X) in the simplest from , showing the domain where :**

$$n(X) = \frac{X^2 + 2X + 4}{X^3 - 8} + \frac{X^2 - 9}{X^2 + X - 6}$$

[b] If the multiplicative inverse of the algebraic fraction $\frac{X^2 + 2X}{X^2 - 2X - k}$ is $\frac{X - 4}{X}$

, find the value of k ?

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5 [a] If A and B are two events from the sample space S of a random experiment

, $P(A) = 0.8$, $P(B) = 0.7$, $P(A \cap B) = 0.6$, **find :**

1 $P(A \cup B)$

2 $P(A - B)$

3 The probability of non-occurrence of A

[b] A point moves on the straight line :

$5X - 2y = 1$, where its y coordinate is twice of the square of its X coordinate.

Find the coordinates of this point.

9 Ismailia Governorate

Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from the given ones :

1 The solution set of the two equations : $X + 3 = 0$ and $y - 5 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(3, 5)\}$ (b) $\{(3, -5)\}$ (c) $\{(-3, 5)\}$ (d) $\{-3, 5\}$

2 If $3^X = 1$, then $X =$ ....

(a) zero (b) 1 (c) 3 (d) -1

3 The set of zeroes of the function f where $f(X) = \frac{X - 3}{X + 2}$ is ....

(a) $\{3\}$ (b) $\{-3\}$ (c) $\{2\}$ (d) $\{-2\}$

4 The solution set of the inequality $X \leq 1$ in $\mathbb{N}$ is ....

(a) $]0, 1[$ (b) $[0, 1]$ (c) $\{1\}$ (d) $\{0, 1\}$

5 If the propability of the success of Ahmed in an algebra exam is 85%

, then the probability of his failure is ....

(a) $\frac{3}{200}$ (b) $\frac{3}{20}$ (c) $\frac{17}{20}$ (d) 0.85

6 If $\sqrt{64 + 36} = 8 + X$, then $X =$ ....

(a) 2 (b) 6 (c) 9 (d) 100

2 **[a] Find in $\mathbb{R}$ the solution set of the equation :** $2x^2 - 5x + 1 = 0$ by using the general rule rounding the result to the nearest one decimal place.

[b] Find n (x) in the simplest form , showing the domain of n where :

$$n(x) = \frac{x^2 + x}{x^2 - x - 2} - \frac{2x + 4}{x^2 - 4}$$

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3 **[a] Find the common domain which the two functions n_1 and n_2 are equal where :**

$$n_1(x) = \frac{x^2 + 2x}{x^2 + 3x + 2} \text{ and } n_2(x) = \frac{x^2 - x}{x^2 - 1}$$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $2x - y = 3$, $x + 2y = 4$

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4 **[a] Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{x^2 + 4x + 3}{x^3 - 27} \div \frac{x + 3}{x^2 + 3x + 9}$$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x - 2y = 0$ and $x^2 - y^2 = 3$

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5 **[a]** If $n(x) = \frac{x - 2}{x + 1}$, then **find :**

1. The domain of n^{-1}
2. $n^{-1}(3)$

[b] If A , B are two events of the sample space of a random experiment , P (A) = 0.8 , P (B) = 0.7 , P ($A \cap B$) = 0.6 , **find :**

1. P ($A \cup B$)
2. P ($\grave{A}$)

10 Kafr El-Sheikh Governorate

Answer the following questions : ***(Calculators are permitted)***

1 **Choose the correct answer from the given ones :**

1. The probability of the impossible event equals ....
   (a) $\varnothing$ (b) zero (c) $\frac{1}{2}$ (d) 1
2. If $2^x = 3$, then $8^x =$ ....
   (a) 3 (b) 6 (c) 9 (d) 27
3. The set of zeroes of the function $f : f(x) = \frac{x^2 - x - 2}{x^2 + 4}$ is ....
   (a) {2 , 1} (b) {– 2 , – 1} (c) {2 , – 1} (d) {– 2 , 2}
4. If $x + y = 7$, $x^2 - y^2 = 14$, then $y - x =$ ....
   (a) 7 (b) – 2 (c) 2 (d) – 7

5 If $P(A) = 4\,P(\grave{A})$, then $P(A) = \cdots\cdots\cdots$

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.2

6 The two straight lines : $3x + 5y = 0$, $5x - 3y = 0$ are intersecting in $\cdots\cdots\cdots$

(a) first quadrant. (b) second quadrant. (c) third quadrant. (d) the origin point.

---

2 [a] **By using the general formula find in $\mathbb{R}$ the solution set of the equation :**

$2x^2 - 5x + 1 = 0$ (rounding the results to one decimal place).

[b] If $n(x) = \frac{x^2 - 2x}{x^2 - 5x + 6}$, find $n^{-1}(x)$ in simplest form and identify the domain of n^{-1}

---

3 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations algebraically :**

$2x - y = 3$, $x + 2y = 4$

[b] If $n(x) = \frac{x^2 + x}{x^2 - x - 2} - \frac{2x + 4}{x^2 - 4}$, find $n(x)$ in the simplest form , showing the domain of n

---

4 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$y - x = 2$, $x^2 + xy - 4 = 0$

[b] If $n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$, find $n(x)$ in the simplest form and identify the domain of n

---

5 [a] If $n_1(x) = \frac{x^2 - 4}{x^2 + x - 6}$, $n_2(x) = \frac{x^2 - x - 6}{x^2 - 9}$

Prove that : $n_1(x) = n_2(x)$ for all the values of x which belong to the common domain and find this domain.

[b] If A , B are two events from the sample space of a random experiment , and $P(B) = \frac{1}{12}$, $P(A \cup B) = \frac{1}{3}$, find P (A) if :

1 A and B are mutually exclusive events. 2 $B \subset A$

11 El-Beheira Governorate

Answer the following questions : (Calculator is permitted)

1 **Choose the correct answer :**

1 If $\sqrt{64 + 36} = 8 + x$, then $x = \cdots\cdots\cdots$

(a) 2 (b) 6 (c) 9 (d) 10

2 If there are infinite number of solutions of the two equations :

$x + 4y = 7$, $3x + ky = 21$ in $\mathbb{R} \times \mathbb{R}$, then k = ...

(a) 4 (b) 7 (c) 12 (d) 21

3 The domain of the multiplicative inverse of the function n : $n(x) = \frac{x+2}{x-3}$ is ....

(a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{-3\}$ (c) $\mathbb{R} - \{-2, 3\}$ (d) $\mathbb{R}$

4 If A , B are two mutually exclusive events from the sample space of a random experiment , then $P(A \cap B) =$ ....

(a) 1 (b) zero (c) $\varnothing$ (d) $\frac{1}{2}$

5 If $x^2 - y^2 = 8$, $x - y = \frac{1}{2}$, then $x + y =$ ....

(a) 16 (b) 4 (c) 2 (d) 8

6 The set of zeroes of the function $f : f(x) = x(x^2 - 9) - 3(x^2 - 9)$ is ....

(a) $\{0, 3\}$ (b) $\{0, -3, 3\}$ (c) $\{-3, 3\}$ (d) $\varnothing$

---

2 [a] **Find algebraically the solution set of the following two equations in $\mathbb{R} \times \mathbb{R}$:**

$5x + y = 12$, $2x - y = 2$

[b] If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, **prove that :** $n_1 = n_2$

---

3 [a] **Solve in $\mathbb{R} \times \mathbb{R}$ the two equations :** $x - y = 1$, $x^2 + y^2 = 25$

[b] **Find in $\mathbb{R}$ the solution set of the equation :**

$x^2 - 2x - 4 = 0$ "approximating the results to the nearest two decimal places"

---

4 [a] If $n(x) = \frac{x^2 - 5x}{(x-5)(x^2+1)}$, find $n^{-1}(x)$ showing the domain of n^{-1}

[b] **Find n (x) in the simplest form , showing the domain where :**

$$n(x) = \frac{x^2 - 5x + 6}{x^3 - 8} \div \frac{x - 3}{x^2 + 2x + 4}$$

---

5 [a] **Find n (x) in the simplest form , showing the domain of n :**

$$n(x) = \frac{x^2 - 8x + 12}{x^2 - 4x + 4} + \frac{x^2 - 4x - 5}{x^2 - 7x + 10}$$

[b] If A and B are two events from a sample space of random experiment and P (A) = 0.7 , P (B) = 0.6 , $P(A \cap B) = 0.4$, **find :**

1 $P(\acute{A})$ 2 $P(A \cup B)$ 3 $P(A - B)$

12 Beni Suef Governorate

Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1. It is said that A and B are two mutually exclusive events , if $A \cap B =$ ....
   (a) A (b) B (c) zero (d) $\varnothing$

2. The volume of the sphere whose radius length is r equals ....
   (a) $\frac{4}{3}\pi r^3$ (b) $\frac{3}{4}\pi r^3$ (c) $4\pi r^2$ (d) $\frac{4}{3}\pi r^2$

3. If $f(a) = \frac{4a^2 - 2a}{2a}$, $a \neq$ zero , then $f(a)$ in the simplest form is ....
   (a) $2a$ (b) $2a - 1$ (c) $4a^2 - 1$ (d) zero

4. Which one of these equations is called an equation of second degree in two variables ?
   (a) $2X - y = 3$ (b) $X^2 + 2X + 1 =$ zero
   (c) $Xy = 3$ (d) $3X + 10 = X$

5. The solution set of the equation : $X^2 = X$ in $\mathbb{R}$ is ....
   (a) $\{0\}$ (b) $\{-1\}$ (c) $\{0 , 1\}$ (d) $\varnothing$

6. If $X^2 - y^2 = 20$, $X + y = 5$, then $X - y =$ ....
   (a) 4 (b) 5 (c) 20 (d) 16

2

[a] Find the set of zeroes of the function f where $f(X) = X^2 - 9$

[b] If A , B are two events of the sample space of a random experiment and P (A) = 0.7 , P (B) = 0.3 , $P(A \cap B) = 0.2$, **find :**

1. The probability of occurrence of the event A only.
2. $P(\grave{B})$
3. $P(A \cup B)$

3

[a] **Find the solution set of two equations :** $X^2 + y^2 = 5$, $X - y = 1$ in $\mathbb{R} \times \mathbb{R}$

[b] **Find n (X) in the simplest form , showing the domain where :**

$$n(X) = \frac{X^2 + 2X}{X^3 - 8} \div \frac{X + 2}{X^2 + 2X + 4}$$

4

[a] **Find the solution set of the equation :** $X^2 - 6X + 7 = 0$ in $\mathbb{R}$ by using the general formula

[b] If $n_1(X) = \frac{X^2 - 4}{X^2 + X - 6}$, $n_2(X) = \frac{X^3 - X^2 - 6X}{X^3 - 9X}$, **prove that :**

$n_1(X) = n_2(X)$ for all the value of X which belong to the common domain and find this domain.

5 [a] If the solution set of the equation : $a\,x^2 + b\,x + 4 = \text{zero}$ in $\mathbb{R}$ is $\{-1 , 1\}$, then find the value of each of : a , b

[b] **Find n (X) in the simplest form , showing the domain of n where :**

$n(x) \dfrac{x^2 - 2x - 3}{x^2 - 3x} + \dfrac{2x - 1}{2x^3 - 3x^2 + x}$, then find n (0) , n (– 1) if possible.

13 Assiut Governorate

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

1 The two straight lines : $x + 5y = 1$ and $x + 5y - 8 = 0$ are ....

(a) parallel. (b) coincident.

(c) perpendicular. (d) intersecting and not perpendicular.

2 If x is a negative number , then the greatest number of the following numbers ....

(a) $5 + x$ (b) $5x$ (c) $5 - x$ (d) $\dfrac{5}{x}$

3 If $x = 3$ is one of the zeroes of the function $f : f(x) = \dfrac{x^2 - 2x - k}{x^2 - 25}$, then k = ...

(a) 3 (b) 6 (c) – 3 (d) – 6

4 If $6^x = 12$, then $6^{x-1} =$ ....

(a) 72 (b) 18 (c) 12 (d) 2

5 A fair die is rolled once , if the event A is the appearance of a prime number and the event B is the appearance of an odd number , then $P(A \cap B) =$ ....

(a) $\dfrac{1}{6}$ (b) $\dfrac{1}{3}$ (c) $\dfrac{1}{2}$ (d) $\dfrac{2}{3}$

6 If $x\,y = 4$, $x\,z = 4$, $\dfrac{1}{y\,z} = 4$, where $x \in \mathbb{R}_+$, $y \in \mathbb{R}_+$, $z \in \mathbb{R}_+$, then $x =$ ....

(a) – 8 (b) 8 (c) ± 8 (d) 64

---

2 [a] Two numbers their sum is 9 and their difference is 5 , find the two numbers.

[b] **Find n (X) in the simplest form , showing the domain of n where :**

$n(x) = \dfrac{3x - 9}{x^2 - 5x + 6} - \dfrac{2x + 6}{6 - x - x^2}$

---

3 [a] **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

, $\dfrac{x}{3} = \dfrac{1}{5 - x}$ "rounding the result to one decimal place"

[b] **Find n (X) in the simplest form , showing the domain of n where :**

$n(x) = \dfrac{x^2 - 3x + 2}{x^3 - 8} \div \dfrac{x - 1}{x^2 + 2x + 4}$

4 [a] **Find in $\mathbb{R} \times \mathbb{R}$, the solution set of the two equations :**

$x + y = 2$, $\frac{1}{x} + \frac{1}{y} = 2$ (where $x \neq 0$, $y \neq 0$)

[b] If $n(x) = \frac{x^2 - 2x}{(x-2)(x^2+6)}$

1 **Find :** $n^{-1}(x)$ in the simplest form showing the domain of n^{-1}

2 If $n^{-1}(x) = 5$, then find the value of x

---

5 [a] If the domain of the function n where $n(x) = \frac{b}{x} + \frac{9}{x + a}$ is $\mathbb{R}$ {0 , 4} , n (5) = 2

, **find value of :** a + b

[b] If A and B are two events in the sample space of a random experiment , P (A) = 0.5 , $P(A \cup B) = 0.8$, $P(B) = x$, find the value of x if :

1 A , B are two mutually exclusive events.

2 $P(A \cap B) = 0.1$

14 Qena Governorate

محافظة قنا

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

1 The set of zeroes of the function $f : f(x) = x^2 + 2$ is ....

(a) {– 2} (b) {2} (c) {– 2 , 2} (d) $\varnothing$

2 If ab = 3 $ab^2 = 12$, then b = ...

(a) 4 (b) 2 (c) – 2 (d) $\frac{3}{4}$

3 If A , B are two mutually exclusive events in the sample space of a random experiment , then $P(A \cap B) =$ ....

(a) zero (b) P (A) (c) P (B) (d) P (A) + P (B)

4 $\sqrt{144 + 25} = 12 +$ ....

(a) – 2 (b) 1 (c) 4 (d) 5

5 The number of solutions of the equation : $3x + 5 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1

(c) 2 (d) an infinit number

6 $3^7 + 3^7 + 3^7 =$ ....

(a) 9^7 (b) 3^{21} (c) $(27)^7$ (d) 3^8

2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$x y = 4 \quad , \quad x + y = 5$

[b] **Find in the simplest form $n^{-1}(x)$ where :** $n(x) = \dfrac{x^2 + x - 12}{x^2 + 5x + 4}$

showing the domain of n^{-1} and find $n^{-1}(0)$ if possible.

---

3 [a] **By using the general formula find in $\mathbb{R}$ the solution set of the equation :**

$x^2 - 6x + 4 = 0$ "approximating the result to the nearest two decimal places".

[b] If $f(x) = \dfrac{x^2}{x^3 - 3x^2}$, $m(x) = \dfrac{x}{x^2 - 3x}$, **prove that :** $f = m$

---

4 [a] **Find n (x) in the simplest form showing the domain :**

$n(x) = \dfrac{x - 3}{x^2 - 9} + \dfrac{x^2 - 2x - 8}{x^2 + 5x + 6}$

[b] A rectangle its length is twice its width and its perimeter 18 cm. , find its area.

---

5 [a] If A and B are two events from the sample space of a random experiment and $P(A) = \frac{1}{3}$, $P(\grave{B}) = \frac{1}{2}$, $P(A \cap B) = \frac{1}{5}$, **find :**

1 $P(B)$ 2 $P(A \cup B)$ 3 $P(B - A)$

[b] **Find n (x) in the simplest form , showing the domain where :**

$n(x) = \dfrac{x^3 - 1}{x^2 - 2x + 1} \times \dfrac{2x - 2}{x^2 + x + 1}$

15 Matrouh Governorate

Answer the following questions : *(Calculator is allowed)*

1 **Choose the correct answer from the given ones :**

1 The probability of the impossible event equals ....

(a) $\varnothing$ (b) zero (c) $\frac{1}{2}$ (d) 1

2 The number of solutions of the two equations :

$x + 2y = 5$, $2x + 4y + 10 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1

(c) 2 (d) an infinite number of solutions.

3 The solution set of the inequality : $x \leq 1$ in $\mathbb{N}$ is ....

(a) $\{1\}$ (b) $\{0 , 1\}$ (c) $]0 , 1[$ (d) $[0 , 1]$

4 The set of zeroes of the function $f : f(x) = -3x$ in $\mathbb{R}$ is ....

(a) $\{0\}$ (b) $\{-3\}$ (c) $\{-3, 0\}$ (d) $\mathbb{R}$

5 If A and B are two events in the sample space of a random experiment , $A \subset B$, $A \neq B$, then $P(A \cup B) =$ ....

(a) zero (b) P (A) (c) P (B) (d) $P(A \cap B)$

6 If $2^x = 3$, then $8^x =$ ....

(a) 6 (b) 9 (c) 12 (d) 27

---

2 [a] **Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:**

$x - y = 5$, $2x + y = 7$

[b] **Find n (x) in the simplest form , showing the domain where :**

$n(x) = \frac{x^2 - 2x}{x^2 - 4} + \frac{2x + 6}{x^2 + 5x + 6}$, **then find :** n (2) if possible.

---

3 [a] If $n_1(x) = \frac{3x}{3x + 9}$, $n_2(x) = \frac{x^2 + 3x}{x^2 + 6x + 9}$, **prove that :** $n_1 = n_2$

[b] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :**

$\frac{y}{x} = 1$, $x^2 + xy + y^2 = 12$

---

4 [a] **Find the solution set of the equation :** $x^2 - 5x + 2 = 0$ in $\mathbb{R}$, by using the general rule "approximate the result to the nearest two decimal places".

[b] **Find n (x) in the simplest form , showing the domain where :**

$n(x) = \frac{x^2 - 3x}{x^3 - 27} \div \frac{2x}{x^2 + 3x + 9}$

---

5 [a] If $n(x) = \frac{x^2 - 2x}{x - 2}$, **then find :**

1 $n^{-1}(x)$ in the simplest form and identify the domain of n^{-1}

2 The value of x , if $n^{-1}(x) = 4$

[b] If A and B are two events from the sample space of a random experiment where $P(\grave{A}) = 0.6$, $P(B) = 0.5$, $P(A \cap B) = 0.2$, **find :**

1 $P(A \cup B)$ 3 $P(A - B)$

Exam 1 Port Said 2024

First Multiple choice questions

Choose the correct answer from those given :

1 The solution set of the two equations : $x = y$ and $x y = 1$ is ....

(a) $\{(1 , 1)\}$ (b) $\{(-1 , -1)\}$
(c) $\{(1 , -1)\}$ (d) $\{(1 , 1) , (-1 , -1)\}$

2 If $n_1(x) = \frac{1+a}{x-2}$, $n_2(x) = \frac{4}{x-2}$ and $n_1(x) = n_2(x)$, then a = ...

(a) 1 (b) 2 (c) 3 (d) 4

3 The common domain for the two functions n_1 , n_2 such that : $n_1(x) = \frac{-1}{x}$ and $n_2(x) = \frac{1}{x-7}$ is ....

(a) $\mathbb{R} - \{7 , 0\}$ (b) $\mathbb{R} - \{7\}$ (c) $\mathbb{R} - \{0\}$ (d) $\mathbb{R}$

4 The number of solutions for the equation : $2x - y = 1$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) 1 (b) 2 (c) zero (d) infinite number.

5 The solution set of the two equations : $x = 3$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\varnothing$ (b) $\{(4 , 3)\}$ (c) $\{(3 , 4)\}$ (d) $\mathbb{R}$

6 $\mathbb{R}_+ \cup \mathbb{R}_- =$ ....

(a) $\mathbb{R}$ (b) $\mathbb{R}^*$ (c) $\varnothing$ (d) $[0 , \infty[$

7 If a die is rolled once , then the probability of getting an odd number and even number together = ...

(a) zero (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 1

8 If the curve of the function $f(x) = x^2 - a$ passes through the point $(1 , 0)$, then a = ...

(a) 2 (b) 1 (c) zero (d) -1

9 The set of zeroes of the function $f(x) = x - 5$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{5\}$ (c) $\{5\}$ (d) $\{0 , 5\}$

10 If $(5 , y-2) = (x+1 , 0)$, then $x + y =$ ....

(a) 6 (b) -6 (c) 2 (d) -2

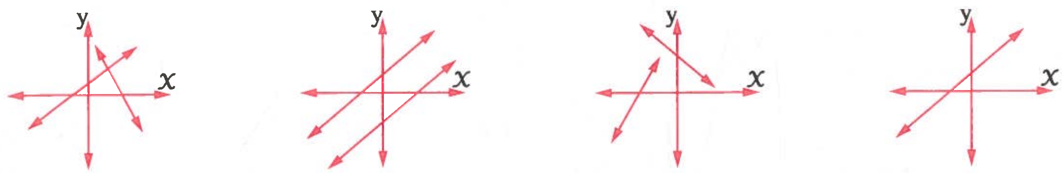
---

11 The probability of a certain event = ...

(a) -1 (b) zero (c) $\frac{1}{2}$ (d) 1

---

12 Which of the following graphs represents two equations of the first degree in two variables and their solution set is $\varnothing$?



(a) (b) (c) (d)

---

13 Two positive numbers their sum = 7 and their product = 12 , then the two numbers are ....

(a) 2 , 5 (b) 2 , 6 (c) 3 , 4 (d) 1 , 6

---

14 The simplest form of the function $n(x) = \frac{2-x}{x-2}$ is .... (where $x \neq 2$)

(a) 2 (b) 1 (c) -1 (d) zero

---

15 If A and B are two events in a sample space of a random experiment and $P(A) = \frac{3}{8}$, $P(B) = \frac{1}{2}$, $P(A \cup B) = \frac{5}{8}$, then $P(A \cap B) =$ ....

(a) zero (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) 1

---

16 If $3^{x-2} = 1$, then $x =$ ....

(a) 3 (b) 2 (c) 1 (d) zero

---

17 If $(x \neq 0)$, then $\frac{5x}{x^2+1} \div \frac{x}{x^2+1} =$ ....

(a) $\frac{-1}{5}$ (b) $\frac{1}{5}$ (c) 5 (d) -5

---

18 The two lines : $x + y = 0$, $2y - x = 0$ intersect at ....

(a) the first quadrant. (b) the second quadrant.

(c) the third quadrant. (d) the origin point.

19 The domain of the additive inverse of the function f where $f(X) = \frac{X-1}{X-5}$ is ....

(a) $\mathbb{R} - \{5\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{-5\}$ (d) $\mathbb{R} - \{5, 1\}$

---

20 If the probability of winning of a team = 0.7 , then the probability of not winning is ....

(a) zero (b) 0.1 (c) 0.2 (d) 0.3

---

21 The domain of the fuction n where $n(X) = \frac{X}{X-1}$ is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{0, 1\}$ (d) $\mathbb{R} - \{-1\}$

Second Essay questions

22 By using the general formula find in $\mathbb{R}$ the solution set of the equation $X^2 - 4X + 1 = 0$ (rounding the result to the first decimal).

---

23 **Find n (X) in the simplest form , showing the domain where :**

$n(X) = \frac{5X}{X-3} - \frac{15}{X-3}$

---

24 If $n(X) = \frac{X-2}{X^2 - 3X + 2}$, find $n^{-1}(X)$ in its simplest form showing the domain.

Exam 2 Port Said 2023

First Multiple choice questions

Choose the correct answer from those given :

1 The solution set of the two equations : $X = 3$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(3, 4)\}$ (b) $\{(4, 3)\}$ (c) $(3, 4)$ (d) $\varnothing$

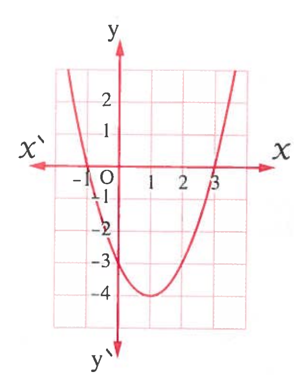
---

2 If $3^X = 1$, then $X =$ ....

(a) -1 (b) 1 (c) zero (d) 3

---

3 The opposite figure represents the graph of a quadratic function f , then the S.S. of the equation $f(X) = 0$ in $\mathbb{R}$ is ....



(a) $\{-3, -1\}$

(b) $\{-1, 3\}$

(c) $\{3, -3\}$

(d) $\{(-1, 3)\}$

4 The set of zeroes of the function $f : f(X) = X - 5$ is ....

(a) $\{zero\}$ (b) $\{5\}$ (c) $\{-5\}$ (d) $\{5, -5\}$

5 The simplest form of the algebraic fraction $\frac{X^2 - 5X + 6}{X - 3}$ is .... where $X \neq 3$

(a) $X - 3$ (b) $\frac{X - 2}{X - 3}$ (c) $X - 2$ (d) $\frac{1}{X - 2}$

6 $\frac{5X}{X^2 + 1} \div \frac{X}{X^2 + 1} =$ .... where $X \neq 0$

(a) -5 (b) -1 (c) 1 (d) 5

7 The common domain of the two fractions $\frac{2X}{X - 3}$ and $\frac{X}{X + 5}$ is ....

(a) $\{3, -5\}$ (b) $\mathbb{R} - \{0, 3, -5\}$ (c) $\mathbb{R} - \{3, -5\}$ (d) $\mathbb{R}$

8 The probability of the impossible event = ...

(a) 1 (b) $\frac{1}{2}$ (c) -1 (d) zero

9 If $X^2 = 16$, then $X =$ .... where $X \in \mathbb{R}$

(a) 4 (b) -4 (c) ± 4 (d) 8

10 The two lines which represent the two equations : $X + y = 3$, $X + y = 5$ are ....

(a) parallel. (b) intersecting. (c) perpendicular. (d) congruent.

11 One of the solutions for the two equations : $X - y = 1$, $X^2 + y^2 = 5$ is ....

(a) $(-2, 1)$ (b) $(2, 1)$ (c) $(1, 2)$ (d) $\{2, 1\}$

12 If $\{-2\}$ is the solution set for the equation : $X^2 - aX + 4 = 0$, then a = ...

(a) -2 (b) -4 (c) 2 (d) 4

13 The domain of the function $f : f(X) = \frac{X + 2}{X - 1}$ is ....

(a) $\mathbb{R} - \{1\}$ (b) $\mathbb{R} - \{-2\}$ (c) $\mathbb{R} - \{1, -2\}$ (d) $\mathbb{R}$

14 $\frac{X - 1}{5} \times \frac{X + 1}{X^2 - 1} =$ .... (where $X \neq \pm 1$)

(a) $\frac{X + 1}{5}$ (b) 5 (c) $\frac{1}{5}$ (d) $\frac{5}{X + 1}$

15 If a die is rolled once, then the probability of getting an odd number = ...

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) zero

16 $|-5|+|5| =$ ....

(a) -10 (b) 25 (c) zero (d) 10

17 The general law to solve the equation : $a x^2 + b x + c = 0$ is .... where a , b , c are real number , $a \neq 0$

(a) $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$ (b) $\frac{b \pm \sqrt{b^2-4ac}}{2a}$ (c) $\frac{-b \pm \sqrt{b-4ac}}{2a}$ (d) $\frac{-b \pm \sqrt{b^2-4ac}}{a}$

18 If A , B are two mutually exclusive events in a simple space , then $P(A \cap B) =$ ....

(a) $\varnothing$ (b) zero (c) 0.5 (d) 1

19 The simplest form of $f(x) = \frac{x}{x-1} - \frac{1}{x-1}$ is .... (where $x \neq 1$)

(a) $\frac{x}{x-1}$ (b) $x-1$ (c) $\frac{x-1}{2}$ (d) 1

20 The number of solutions of the equation : $x + y = 5$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero. (b) one. (c) two. (d) an infinite number.

21 If A , B are two events in a sample space and $P(A) = 0.3$, $P(B) = 0.6$ and $P(A \cap B) = 0.2$, then $P(A \cup B) =$ ....

(a) 0.6 (b) 0.7 (c) 0.9 (d) 0.5

Second Essay questions

22 **Find the solution set in $\mathbb{R} \times \mathbb{R}$ for the two equations : $x = 3$, $x y = 6$**

23 **Find n (x) in the simplest form and mention the domain :** $n(x) = \frac{x-3}{x^2-7x+12} + \frac{x-5}{x-4}$

24 If $n(x) = \frac{x^2-5x+6}{x^2-9}$, find $n^{-1}(x)$ in its simplest form showing the domain.

Answers of governorates' examinations of algebra & probability

1 Cairo

1

1 d 2 a 3 c 4 c 5 a 6 b

2

[a] $\because x^2-3x+1=0$

$\therefore a=1 \ , b=-3 \ , c=1$

$\therefore x=\frac{3\pm\sqrt{(-3)^2-4\times1\times1}}{2\times1}=\frac{3\pm\sqrt{5}}{2}$

$\therefore x\simeq2.6$ or $x\simeq0.4$

$\therefore$ The S.S. $=\{2.6 \ , 0.4\}$

[b] $\because n(x)=\frac{x+1}{(x-3)(x+1)}\times\frac{(x-3)(x+3)}{x+3}$

$\therefore$ The domain of n $=\mathbb{R}-\{3 \ , -1 \ , -3\}$

$, n(x)=1$

3

[a] $\because x+y=6$ (multiplying by 2)

$\therefore 2x+2y=12$ (1)

$, x-2y=3$ (2)

Adding (1) and (2) :

$\therefore 3x=15$ $\therefore x=5$

Substituting in (2) : $\therefore y=1$

$\therefore$ The S.S. $=\{(5 \ , 1)\}$

[b] $\because n(x)=\frac{x-2}{(x-2)(x+2)}+\frac{x^2-2x+4}{(x+2)(x^2-2x+4)}$

$\therefore$ The domain of n $=\mathbb{R}-\{2 \ , -2\}$

$, n(x)=\frac{1}{x+2}+\frac{1}{x+2}=\frac{2}{x+2}$

4

[a] $\because$ A , B are two mutually exclusive events

$\therefore P(A\cap B)=0$

1 $P(A\cup B)=P(A)+P(B)$

$=0.3+0.4=0.7$

2 $P(A-B)=P(A)=0.3$

[b] $\because n(x)=\frac{(x-1)(x+1)}{(x-1)(x+2)}$

$\therefore n^{-1}(x)=\frac{(x-1)(x+2)}{(x-1)(x+1)}$

$\therefore$ The domain of $n^{-1}=\mathbb{R}-\{1 \ , -1 \ , -2\}$

$, n^{-1}(x)=\frac{x+2}{x+1}$

5

[a] $\because x-y=0$ $\therefore x=y$ (1)

$, x^2+y=2$ (2)

Substituting from (1) in (2)

$\therefore x^2+x=2$ $\therefore x^2+x-2=0$

$\therefore (x+2)(x-1)=0$

$\therefore x=-2$ or $x=1$

Substituting in (1) :

$\therefore y=-2$ or $y=1$

$\therefore$ The S.S. $=\{(-2 \ , -2) \ , (1 \ , 1)\}$

[b] $\because n(x)=\frac{x^2}{x-1}-\frac{x}{x-1}$

$\therefore$ The domain of n $=\mathbb{R}-\{1\}$

$, n(x)=\frac{x^2-x}{x-1}=\frac{x(x-1)}{x-1}=x$

2 Giza

1

1 b 2 c 3 a 4 d 5 b 6 c

2

[a] $\because x+2y=4$ (1)

$, 3x-y=5$ (multiplying by 2)

$\therefore 6x-2y=10$ (2)

Adding (1) and (2) :

$\therefore 7x=14$ $\therefore x=2$

Substituting in (1) : $\therefore y=1$

$\therefore$ The S.S. $=\{(2 \ , 1)\}$

[b] $\because n_1(x)=\frac{x(x+2)}{(x-2)(x+2)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_1=\mathbb{R}-\{2 \ , -2\}\\ , n_1(x)=\frac{x}{x-2}\end{array}\right\}(1)$$

$, \because n_2(x)=\frac{x(x-1)}{(x-2)(x-1)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_2=\mathbb{R}-\{2 \ , 1\}\\ , n_2(x)=\frac{x}{x-2}\end{array}\right\}(2)$$

From (1) and (2) : $\therefore n_1\neq n_2$

because the domain of $n_1\neq$ the domain of n_2

, the common domain $=\mathbb{R}-\{2 \ , -2 \ , 1\}$

3

[a] $\because y - x = 2$

$\therefore y = x + 2 \qquad (1)$

, $xy = 15 \qquad (2)$

Substituting from (1) in (2)

$\therefore x(x+2) = 15$

$\therefore x^2 + 2x - 15 = 0$

$\therefore (x-3)(x+5) = 0$

$\therefore x = 3$ or $x = -5$

Substituting in (1) :

$\therefore y = 5$ or $y = -3$

$\therefore$ The S.S. $= \{(3, 5), (-5, -3)\}$

[b] $\because n(x) = \dfrac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \div \dfrac{x+3}{x^2+3x+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -3\}$

, $n(x) = \dfrac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \times \dfrac{x^2+3x+9}{x+3}$

$= \dfrac{x+1}{x-3}$

4

[a] $\because x^2 - 5x + 3 = 0$

$\therefore a = 1, b = -5, c = 3$

$\therefore x = \dfrac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2 \times 1} = \dfrac{5 \pm \sqrt{13}}{2}$

$\therefore x \simeq 4.3$ or $x \simeq 0.7$

$\therefore$ The S.S. $= \{4.3, 0.7\}$

[b] $\because n(x) = \dfrac{x(x-1)}{(x-1)(x+1)} + \dfrac{x+5}{(x+5)(x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{1, -1, -5\}$

, $n(x) = \dfrac{x}{x+1} + \dfrac{1}{x+1} = \dfrac{x+1}{x+1} = 1$

5

[a] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.7 + 0.5 - 0.3 = 0.9$

2 $P(\grave{A}) = 1 - P(A)$

$= 1 - 0.7 = 0.3$

[b] $\because n(x) = \dfrac{x(x-2)}{(x-2)(x-3)}$

$\therefore n^{-1}(x) = \dfrac{(x-2)(x-3)}{x(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 2, 3\}$

, $n^{-1}(x) = \dfrac{x-3}{x}$

3 Alexandria

1

1 b 2 c 3 a 4 d 5 b 6 d

2

[a] $\because 3x + y = 3 \qquad (1)$

, $2x - y = 7 \qquad (2)$

Adding (1) and (2) :

$\therefore 5x = 10 \qquad \therefore x = 2$

Substituting in (1) : $\therefore y = -3$

$\therefore$ The S.S. $= \{(2, -3)\}$

[b] $\because n_1(x) = \dfrac{2x(x^2+3)}{(x-1)(x^2+3)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{1\} \\ , n_1(x) = \dfrac{2x}{x-1}\end{array}\right\}(1)$

$\left.\begin{array}{l}, \because n_2(x) = \dfrac{2x}{x-1} \\ \therefore \text{The domain of } n_2 = \mathbb{R} - \{1\}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

3

[a] $\because y - x = 2$

$\therefore y = x + 2 \qquad (1)$

, $x^2 + xy - 4 = 0 \qquad (2)$

Substituting from (1) in (2)

$\therefore x^2 + x(x+2) - 4 = 0$

$\therefore x^2 + x^2 + 2x - 4 = 0$

$\therefore 2x^2 + 2x - 4 = 0$

$\therefore x^2 + x - 2 = 0$

$\therefore (x+2)(x-1) = 0$

$\therefore x = -2$ or $x = 1$

Substituting in (1) :

$\therefore y = 0$ or $y = 3$

$\therefore$ The S.S. $= \{(-2, 0), (1, 3)\}$

[b] $\because n(x) = \dfrac{x}{x(x+2)} + \dfrac{x-2}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, -2, 2\}$

, $n(x) = \dfrac{1}{x+2} + \dfrac{1}{x+2} = \dfrac{2}{x+2}$

4

[a] $\because x^2+3x-3=0$

$a=1 \;, b=3 \;, c=-3$

$\therefore x=\frac{-3\pm\sqrt{(3)^2-4\times1\times(-3)}}{2\times1}=\frac{-3\pm\sqrt{21}}{2}$

$\therefore x\simeq 0.8$ or $x\simeq -3.8$

[b] $\because n(x)=\frac{(x-2)(x^2+2x+4)}{(x-2)(x+3)}\div\frac{x^2+2x+4}{x+3}$

$\therefore$ The domain of $n=\mathbb{R}-\{2 \;,-3\}$

$, n(x)=\frac{x^2+2x+4}{x+3}\times\frac{x+3}{x^2+2x+4}=1$

5

[a] 1 $P(A\cup B)=P(A)+P(B)-P(A\cap B)$

$=\frac{1}{2}+\frac{1}{3}-\frac{1}{6}=\frac{2}{3}$

2 $\because$ A and B are two mutually exclusive events

$\therefore P(A\cap B)=0$

$\therefore P(A\cup B)=P(A)+P(B)$

$=\frac{1}{2}+\frac{1}{3}=\frac{5}{6}$

[b] $\because n(x)=\frac{x+3}{x-5}$

$\therefore n^{-1}(x)=\frac{x-5}{x+3}$

$\therefore$ The domain of $n^{-1}=\mathbb{R}-\{-3 \;, 5\}$

$, n^{-1}(4)=\frac{4-5}{4+3}=-\frac{1}{7}$

4 El-Kalyoubia

1

1 c 2 b 3 a 4 d 5 c 6 b

2

[a] $\because x+y=5$ (1)

$, x-y=1$ (2)

Adding (1) and (2) :

$\therefore 2x=6$ $\therefore x=3$

Substituting in (1) : $\therefore y=2$

$\therefore$ The S.S. $=\{(3 \;, 2)\}$

[b] $\because n(x)=\frac{x-3}{(x-3)(x-4)}-\frac{4x}{x(x-4)}$

$\therefore$ The domain of $n=\mathbb{R}-\{3 \;, 4 \;, 0\}$

$, n(x)=\frac{1}{x-4}-\frac{4}{x-4}=-\frac{3}{x-4}$

3

[a] $\because x^2-6x+4=0$

$\therefore a=1 \;, b=-6 \;, c=4$

$\therefore x=\frac{6\pm\sqrt{(-6)^2-4\times1\times4}}{2\times1}=\frac{6\pm2\sqrt{5}}{2}=3\pm\sqrt{5}$

$\therefore x\simeq 5.236$ or $x\simeq 0.764$

$\therefore$ The S.S. $=\{5.236 \;, 0.764\}$

[b] $\left.\begin{array}{l}\because n_1(x)=\frac{x}{(x-2)(x+2)}\\ \therefore \text{The domain of } n_1=\mathbb{R}-\{2 \;,-2\}\end{array}\right\}(1)$

$, \because n_2(x)=\frac{2x}{2(x-2)(x+2)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2=\mathbb{R}-\{2 \;,-2\}\\ , n_2(x)=\frac{x}{(x-2)(x+2)}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1=n_2$

4

[a] $\because y=3+x$ (1)

$, x^2-2x+3y=15$ (2)

Substituting from (1) in (2) :

$\therefore x^2-2x+3(3+x)-15=0$

$\therefore x^2-2x+9+3x-15=0$

$\therefore x^2+x-6=0$

$\therefore (x+3)(x-2)=0$

$\therefore x=-3$ or $x=2$

Substituting in (1) :

$\therefore y=0$ or $y=5$

$\therefore$ The S.S. $=\{(-3 \;, 0) \;, (2 \;, 5)\}$

[b] $\because$ The domain of $n=\mathbb{R}-\{3\}$

$\therefore$ At $x=3$

$\therefore x^2-ax+9=0$

$\therefore 3^2-3a+9=0$

$\therefore -3a=-18$

$\therefore a=6$

5

[a] $\because n(x)=\frac{(x-2)(x+1)}{(x-1)(x+1)}\div\frac{3(x-5)}{(x-5)(x-1)}$

$\therefore$ The domain of $n=\mathbb{R}-\{1 \;,-1 \;, 5\}$

$, n(x)=\frac{x-2}{x-1}\times\frac{x-1}{3}=\frac{x-2}{3}$

[b] 1 $P(A-B)=\frac{1}{6}$

2 The probability of non-occurrence of the event $A = P(\grave{A}) = 1 - P(A)$

$= 1 - \frac{3}{6} = \frac{3}{6} = \frac{1}{2}$

5 El-Sharkia

1

1 b 2 d 3 c 4 b 5 a 6 c

2

[a] $\because 2y = x - 5$

$\therefore x - 2y = 5$ (1)

$, \because 4x + y = 2$ (multiplying by 2)

$\therefore 8x + 2y = 4$ (2)

Adding (1) and (2) :

$\therefore 9x = 9 \qquad \therefore x = 1$

Substituting in (1) : $\therefore y = -2$

$\therefore$ The S.S. $= \{(1, -2)\}$

[b] $\because f(x) = \frac{(x-3)^2}{(x-3)(x^2+3x+9)} \div \frac{x(x-3)}{x^2+3x+9}$

$\therefore$ The domain of $f = \mathbb{R} - \{3, 0\}$

$, f(x) = \frac{x-3}{x^2+3x+9} \times \frac{x^2+3x+9}{x(x-3)} = \frac{1}{x}$

$, f(3)$ is undefined because $3 \notin$ the domain of f

3

[a] $\because x^2 - 2x - 4 = 0$

$\therefore a = 1 \ , b = -2 \ , c = -4$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times (-4)}}{2 \times 1} = \frac{2 \pm 2\sqrt{5}}{2} = 1 \pm \sqrt{5}$

$\therefore x \simeq 3.24$ or $x \simeq -1.24$

$\therefore$ The S.S. $= \{3.24, -1.24\}$

[b] $\because n_1(x) = \frac{x(x-1)}{x^2(x-2)}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 2\} \\ , n_1(x) = \frac{x-1}{x(x-2)} \end{array}\right\} (1)$

$, \because n_2(x) = \frac{(x-2)(x-1)}{x(x-2)^2}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 2\} \\ , n_2(x) = \frac{x-1}{x(x-2)} \end{array}\right\} (2)$

From (1) and (2) : $\therefore n_1 = n_2$

4

[a] $\because x + y = 2$

$\therefore y = 2 - x$ (1)

$, y + x = 2xy$ (2)

Substituting from (1) in (2) :

$\therefore x + 2 - x = 2x(2 - x)$

$\therefore 2 = 4x - 2x^2$

$\therefore 2x^2 - 4x + 2 = 0$

$\therefore x^2 - 2x + 1 = 0$

$\therefore (x-1)^2 = 0 \qquad \therefore x - 1 = 0$

$\therefore x = 1$

Substituting in (1) :

$\therefore y = 1$

$\therefore$ The S.S. $= \{(1, 1)\}$

[b] $\because f(x) = \frac{2x-6}{x^2-9} + \frac{8}{x^2+2x-3}$

$= \frac{2(x-3)}{(x-3)(x+3)} + \frac{8}{(x+3)(x-1)}$

$\therefore$ The domain of $f = \mathbb{R} - \{3, -3, 1\}$

$, f(x) = \frac{2}{x+3} + \frac{8}{(x+3)(x-1)} = \frac{2(x-1)+8}{(x+3)(x-1)}$

$= \frac{2x-2+8}{(x+3)(x-1)} = \frac{2x+6}{(x+3)(x-1)}$

$= \frac{2(x+3)}{(x+3)(x-1)} = \frac{2}{x-1}$

5

[a] 1 $\frac{11}{15}$ 2 $\frac{4}{15}$

[b] $\because$ The domain of $n = \mathbb{R} - \{0, -1\}$

$\therefore$ At $x = -1 \qquad \therefore x + m = 0$

$\therefore -1 + m = 0 \qquad \therefore m = 1$

$\therefore n(x) = \frac{\ell}{x} - \frac{8}{x+1}$

$, \because n(-3) = 1 \qquad \therefore \frac{\ell}{-3} - \frac{8}{-3+1} = 1$

$\therefore \frac{\ell}{-3} - \frac{8}{-2} = 1 \qquad \therefore \frac{\ell}{-3} + 4 = 1$

$\therefore \frac{\ell}{-3} = -3 \qquad \therefore \ell = 9$

6 El-Monofia

1

1 b 2 d 3 c 4 a 5 c 6 b

2

[a] $\because 3x + 2y = 4$ (1)

$, x - 3y = 5$

$\therefore x = 3y + 5$ (2)

Substituting from (2) in (1) :

$\therefore 3(3y + 5) + 2y = 4$

$\therefore 9y + 15 + 2y = 4$

$\therefore 11y = -1 1 \qquad \therefore y = -1$

Substituting in (2) : $\therefore x = 2$

$\therefore$ The S.S. $= \{(2, -1)\}$

[b] $\because n(x) = \frac{x^2 + 2x + 4}{(x-2)(x^2 + 2x + 4)} + \frac{(x+2)(x-1)}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -2\}$

$, n(x) = \frac{1}{x-2} + \frac{x-1}{x-2} = \frac{x}{x-2}$

3

[a] $\because y = x - 3$ (1)

$, x^2 + y^2 = 17$ (2)

Substituting from (1) in (2) :

$\therefore x^2 + (x-3)^2 = 17$

$\therefore x^2 + x^2 - 6x + 9 - 17 = 0$

$\therefore 2x^2 - 6x - 8 = 0$

$\therefore x^2 - 3x - 4 = 0$

$\therefore (x-4)(x+1) = 0$

$\therefore x = 4$ or $x = -1$

Substituting in (1) :

$\therefore y = 1$ or $y = -4$

$\therefore$ The S.S. $= \{(4, 1), (-1, -4)\}$

[b] $\because n_1(x) = \frac{2x}{2(x+2)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \\ , n_1(x) = \frac{x}{x+2}\end{array}\right\}(1)$

$, \because n_2(x) = \frac{x(x+2)}{(x+2)^2}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\} \\ , n_2(x) = \frac{x}{x+2}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

4

[a] $\because x^2 - 2x - 4 = 0$

$\therefore a = 1, b = -2, c = -4$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times (-4)}}{2 \times 1} = \frac{2 \pm 2\sqrt{5}}{2} = 1 \pm \sqrt{5}$

$\therefore x \simeq 3.24$ or $x \simeq -1.24$

$\therefore$ The S.S. $= \{3.24, -1.24\}$

[b] $\because n(x) = \frac{3x(x-2)}{(x-2)(x+2)} \times \frac{(x+2)(x+1)}{x(x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -2, 0, -1\}$

$, n(x) = 3$

5

[a] 1 $P(\acute{A}) = 1 - P(A)$

$= 1 - 0.6 = 0.4$

2 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.6 + 0.5 - 0.3 = 0.8$

3 $P(B - A) = P(B) - P(A \cap B)$

$= 0.5 - 0.3 = 0.2$

[b] 1 $\because n(x) = \frac{x+2}{(x-3)(x+2)}$

$\therefore n^{-1}(x) = \frac{(x-3)(x+2)}{x+2}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{-2, 3\}$

$, n^{-1}(x) = x - 3$

2 $\because n^{-1}(x) = 2$

$\therefore x - 3 = 2 \quad \therefore x = 5$

7 El-Gharbia

1

1 d 2 d 3 c 4 c 5 b 6 a

2

[a] $\because x + y = 10$

$\therefore x = 10 - y$ (1)

$, x^2 - y^2 = 40$ (2)

Substituting from (1) in (2) :

$\therefore (10 - y)^2 - y^2 = 40$

$\therefore 100 - 20y + y^2 - y^2 = 40$

$\therefore -20y = -60 \qquad \therefore y = 3$

Substituting in (1) :

$\therefore x = 7$

$\therefore$ The S.S. $= \{(7, 3)\}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.6 + 0.5 - 0.3 = 0.8$

2 $P(B - A) = P(B) - P(A \cap B)$

$= 0.5 - 0.3 = 0.2$

3

[a] $\because$ The domain of $n = \mathbb{R} - \{0, 4\}$

$\therefore$ At $x = 4$ $\quad \therefore x + a = 0$

$\therefore 4 + a = 0$ $\quad \therefore a = -4$

$\therefore n(x) = \frac{b}{x} + \frac{9}{x-4}$

$, \because n(5) = 2$

$\therefore \frac{b}{5} + \frac{9}{5-4} = 2$ $\quad \therefore \frac{b}{5} + 9 = 2$ $\quad \therefore \frac{b}{5} = 2 - 9$

$\therefore \frac{b}{5} = -7$ $\quad \therefore b = -35$

[b] $\because n_1(x) = \frac{(x+2)(x-2)}{(x+3)(x-2)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-3, 2\}$

$, n_1(x) = \frac{x+2}{x+3}$

$, \because n_2(x) = \frac{x(x-3)(x+2)}{x(x-3)(x+3)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{0, 3, -3\}$

$n_2(x) = \frac{x+2}{x+3}$

$\therefore n_1(x) = n_2(x)$

For all the values of $x \in \mathbb{R} - \{0, 2, 3, -3\}$

4

[a] $\because n(x) = \frac{(x-3)(x+3)}{x(2x+3)} \div \frac{(2x-3)(x+3)}{(2x-3)(2x+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, \frac{-3}{2}, \frac{3}{2}, -3\}$

$, n(x) = \frac{(x-3)(x+3)}{x(2x+3)} \times \frac{2x+3}{x+3}$

$= \frac{x-3}{x}$

[b] $\because 3x^2 - 5x + 1 = 0$

$\therefore a = 3 \quad , \quad b = -5 \quad , \quad c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore x \simeq 1.43$ or $x \simeq 0.23$

$\therefore$ The S.S. $= \{1.43, 0.23\}$

5

[a] $\because n(x) = \frac{3x-4}{(x-3)(x-2)} + \frac{2(x+3)}{(x+3)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, 2, -3\}$

$, n(x) = \frac{3x-4}{(x-3)(x-2)} + \frac{2}{(x-2)}$

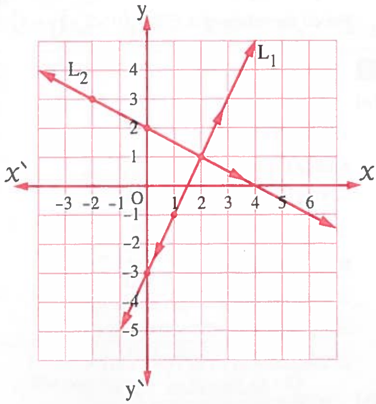
$= \frac{3x - 4 + 2(x-3)}{(x-3)(x-2)} = \frac{3x - 4 + 2x - 6}{(x-3)(x-2)}$

$= \frac{5x - 10}{(x-3)(x-2)} = \frac{5(x-2)}{(x-3)(x-2)} = \frac{5}{x-3}$

[b] $y = 2x - 3$ $\qquad x = 4 - 2y$

x	0	1	2
y	-3	-1	1

x	-2	0	2
y	3	2	1



From the graph , the S.S. $= \{(2, 1)\}$

8 El-Dakahlia

1

[a] 1 c $\quad$ 2 a $\quad$ 3 b

[b] $\because 1 - \frac{2}{x} = \frac{2}{x^2}$ (multiplying by x^2)

$\therefore x^2 - 2x = 2$

$\therefore x^2 - 2x - 2 = 0$

$\therefore a = 1 \quad , \quad b = -2 \quad , \quad c = -2$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times (-2)}}{2 \times 1} = \frac{2 \pm 2\sqrt{3}}{2}$

$= 1 \pm \sqrt{3}$

$\therefore x \simeq 2.732$ or $x \simeq -0.732$

$\therefore$ The S.S. $= \{2.732, -0.732\}$

2

[a] 1 b $\quad$ 2 a $\quad$ 3 c

[b] $\because n_1(x) = \frac{(x-2)(x+2)}{(x-2)(x+3)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2, -3\}$

$, n_1(x) = \frac{x+2}{x+3}$

$\because n_2(x) = \frac{x(x-3)(x+2)}{x(x-3)(x+3)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{0, 3, -3\}$

$, n_2(x) = \frac{x+2}{x+3}$

$\therefore n_1(x) = n_2(x)$

For all the values of $x \in \mathbb{R} - \{0, 2, 3, -3\}$

3

[a] $\because 2|x| - |y| = 2$ (1)

$, 3|x| + |y| = 3$ (2)

Adding (1) and (2) :

$\therefore 5|x| = 5 \quad \therefore |x| = 1$

$\therefore x = 1$ or $x = -1$

Substituting in (1) :

$\therefore 2 \times 1 - |y| = 2$

$\therefore -|y| = 2 - 2 = 0 \quad \therefore y = 0$

$\therefore$ The S.S. $= \{(1, 0), (-1, 0)\}$

[b] $\because n(x) = \frac{(x+3)(x-5)}{(x+3)(x-3)} \div \frac{2(x-5)}{(x-3)^2}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 3, 5\}$

$, n(x) = \frac{x-5}{x-3} \times \frac{(x-3)^2}{2(x-5)} = \frac{x-3}{2}$

4

[a] $\because n(x) = \frac{x^2+2x+4}{(x-2)(x^2+2x+4)} + \frac{(x-3)(x+3)}{(x+3)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -3\}$

$, n(x) = \frac{1}{x-2} + \frac{x-3}{x-2} = \frac{1+x-3}{x-2} = \frac{x-2}{x-2} = 1$

[b] $\because \frac{x^2+2x}{x^2-2x-k} \times \frac{x-4}{x} = 1$

$\therefore \frac{\cancel{x}(x+2)}{x^2-2x-k} \times \frac{x-4}{\cancel{x}} = 1$

$\therefore \frac{(x+2)(x-4)}{x^2-2x-k} = 1$

$\therefore \frac{x^2-2x-8}{x^2-2x-k} = 1$

$\therefore x^2 - 2x - 8 = x^2 - 2x - k$

$\therefore k = 8$

5

[a] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.8 + 0.7 - 0.6 = 0.9$

2 $P(A - B) = P(A) - P(A \cap B)$

$= 0.8 - 0.6 = 0.2$

3 The probability of non-occurence of A

$= P(\grave{A}) = 1 - P(A) = 1 - 0.8 = 0.2$

[b] Let the x coordinate be x and the y coordinate be y

$\therefore y = 2x^2$ (1)

$\because$ The point moves on the straight line

$\therefore$ The coordinates of the point satisfy its equation

$, \because 5x - 2y - 1 = 0$ (2)

Substituting from (1) in (2) :

$\therefore 5x - 2(2x^2) - 1 = 0$

$\therefore -4x^2 + 5x - 1 = 0$

$\therefore 4x^2 - 5x + 1 = 0$

$\therefore (4x-1)(x-1) = 0$

$\therefore x = \frac{1}{4}$ or $x = 1$

Substituting in (1) :

$\therefore y = \frac{1}{8}$ or $y = 2$

$\therefore$ The point is $\left(\frac{1}{4}, \frac{1}{8}\right)$ or $(1, 2)$

9 Ismailia

1

1 c 2 a 3 a 4 d 5 b 6 a

2

[a] $\because 2x^2 - 5x + 1 = 0$

$\therefore a = 2, \quad b = -5, \quad c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{5 \pm \sqrt{17}}{4}$

$\therefore x \simeq 2.3$ or $x \simeq 0.2$

$\therefore$ The S.S. $= \{2.3, 0.2\}$

[b] $\because n(x) = \frac{x(x+1)}{(x-2)(x+1)} - \frac{2(x+2)}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -1, -2\}$

$, n(x) = \frac{x}{x-2} - \frac{2}{x-2} = \frac{x-2}{x-2} = 1$

3

[a] $\because n_1(x) = \frac{x(x+2)}{(x+2)(x+1)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-2, -1\}$

, $n_1(x) = \frac{x}{x+1}$

, $\because n_2(x) = \frac{x(x-1)}{(x-1)(x+1)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{1, -1\}$

, $n_2(x) = \frac{x}{x+1}$

$\therefore n_1(x) = n_2(x)$

for all the values of $x \in \mathbb{R} - \{-2, -1, 1\}$

[b] $\because 2x - y = 3$ (multiplying by 2)

$\therefore 4x - 2y = 6$ (1)

, $x + 2y = 4$ (2)

Adding (1) and (2) :

$\therefore 5x = 10$ $\therefore x = 2$

Substituting in (2) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2, 1)\}$

4

[a] $\because n(x) = \frac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \div \frac{x+3}{x^2+3x+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -3\}$

, $n(x) = \frac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \times \frac{x^2+3x+9}{x+3}$

$= \frac{x+1}{x-3}$

[b] $\because x - 2y = 0$

$\therefore x = 2y$ (1)

, $x^2 - y^2 = 3$ (2)

Substituting from (1) in (2) :

$\therefore (2y)^2 - y^2 = 3$

$\therefore 4y^2 - y^2 = 3$ $\therefore 3y^2 = 3$

$\therefore y^2 = 1$ $\therefore y = 1$ or $y = -1$

Substituting in (1) :

$\therefore x = 2$ or $x = -2$

$\therefore$ The S.S. $= \{(2, 1), (-2, -1)\}$

5

[a] 1 $\because n(x) = \frac{x-2}{x+1}$

$\therefore n^{-1}(x) = \frac{x+1}{x-2}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2, -1\}$

2 $n^{-1}(3) = \frac{3+1}{3-2} = 4$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.8 + 0.7 - 0.6 = 0.9$

2 $P(\grave{A}) = 1 - P(A)$

$= 1 - 0.8 = 0.2$

10 Kafr El-Sheikh

1

1 b 2 d 3 c 4 b 5 a 6 d

2

[a] $\because 2x^2 - 5x + 1 = 0$

$\therefore a = 2$, $b = -5$, $c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{5 \pm \sqrt{17}}{4}$

$\therefore x \simeq 2.3$ or $x \simeq 0.2$

$\therefore$ The S.S. $= \{2.3, 0.2\}$

[b] $\because n(x) = \frac{x(x-2)}{(x-3)(x-2)}$

$\therefore n^{-1}(x) = \frac{(x-3)(x-2)}{x(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 2, 3\}$

, $n^{-1}(x) = \frac{x-3}{x}$

3

[a] $\because 2x - y = 3$ (multiplying by 2)

$\therefore 4x - 2y = 6$ (1)

, $x + 2y = 4$ (2)

Adding (1) and (2) : $\therefore 5x = 10$ $\therefore x = 2$

Substituting in (2) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2, 1)\}$

[b] $\because n(x) = \frac{x(x+1)}{(x-2)(x+1)} - \frac{2(x+2)}{(x-2)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -1, -2\}$

, $n(x) = \frac{x}{x-2} - \frac{2}{x-2} = \frac{x-2}{x-2} = 1$

4

[a] $\because y - x = 2$ $\therefore y = 2 + x$ (1)

, $x^2 + xy - 4 = 0$ (2)

Substituting from (1) in (2) :

$\therefore x^2 + x(2 + x) - 4 = 0$

$\therefore x^2 + 2x + x^2 - 4 = 0$

$\therefore 2x^2 + 2x - 4 = 0$

$\therefore x^2 + x - 2 = 0$

$\therefore (x + 2)(x - 1) = 0$

$\therefore x = -2$ or $x = 1$

Substituting in (1) :

$\therefore y = 0$ or $y = 3$

$\therefore$ The S.S. $= \{(-2, 0), (1, 3)\}$

[b] $\because n(x) = \dfrac{(x-1)(x^2+x+1)}{(x-1)^2} \times \dfrac{2(x-1)}{x^2+x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

, $n(x) = 2$

5

[a] $\because n_1(x) = \dfrac{(x-2)(x+2)}{(x-2)(x+3)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2, -3\}$

, $n_1(x) = \dfrac{x+2}{x+3}$

, $\because n_2(x) = \dfrac{(x-3)(x+2)}{(x-3)(x+3)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{3, -3\}$

, $n_2(x) = \dfrac{x+2}{x+3}$

$\therefore n_1(x) = n_2(x)$

For all the value of $x \in \mathbb{R} - \{2, 3, -3\}$

[b] 1 $\because$ A and B are two mutually exclusive events

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B)$

$\therefore \frac{1}{3} = P(A) + \frac{1}{12}$

$\therefore P(A) = \frac{1}{3} - \frac{1}{12} = \frac{1}{4}$

2 $\because B \subset A$

$\therefore P(A) = P(A \cup B) = \frac{1}{3}$

11 El-Beheira

1

1 a   2 c   3 c   4 b   5 a   6 c

2

[a] $\because 5x + y = 12$ (1)

, $2x - y = 2$ (2)

Adding (1) and (2) :

$\therefore 7x = 14$ $\therefore x = 2$

Substituting in (2) :

$\therefore y = 2$

$\therefore$ The S.S. $= \{(2, 2)\}$

[b] $\because n_1(x) = \dfrac{x^2}{x^2(x-1)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \\ , n_1(x) = \dfrac{1}{x-1}\end{array}\right\}(1)$$

, $\because n_2(x) = \dfrac{x(x^2+x+1)}{x(x-1)(x^2+x+1)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\} \\ , n_2(x) = \dfrac{1}{x-1}\end{array}\right\}(2)$$

From (1) and (2) : $\therefore n_1 = n_2$

3

[a] $\because x - y = 1$

$\therefore x = 1 + y$ (1)

, $x^2 + y^2 = 25$ (2)

Substituting from (1) in (2) :

$\therefore (1 + y)^2 + y^2 = 25$

$\therefore 1 + 2y + y^2 + y^2 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0$

$\therefore y^2 + y - 12 = 0$

$\therefore (y + 4)(y - 3) = 0$

$\therefore y = -4$ or $y = 3$

Substituting in (1) :

$\therefore x = -3$ or $x = 4$

[b] $\because x^2 - 2x - 4 = 0$

$\therefore a = 1, b = -2, c = -4$

$\therefore x = \dfrac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times (-4)}}{2 \times 1} = \dfrac{2 \pm 2\sqrt{5}}{2} = 1 \pm \sqrt{5}$

$\therefore x \simeq 3.24$ or $x \simeq -1.24$

$\therefore$ The S.S. $= \{3.24, -1.24\}$

4

[a] $\because n(x) = \dfrac{x(x-5)}{(x-5)(x^2+1)}$

$\therefore n^{-1}(x) = \dfrac{(x-5)(x^2+1)}{x(x-5)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 5\}$

, $n^{-1}(x) = \frac{x^2+1}{x}$

[b] $\because n(x) = \frac{(x-3)(x-2)}{(x-2)(x^2+2x+4)} \div \frac{x-3}{x^2+2x+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , 3\}$

, $n(x) = \frac{x-3}{x^2+2x+4} \times \frac{x^2+2x+4}{x-3} = 1$

5

[a] $\because n(x) = \frac{(x-2)(x-6)}{(x-2)^2} + \frac{(x-5)(x+1)}{(x-5)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , 5\}$

, $n(x) = \frac{x-6}{x-2} + \frac{x+1}{x-2} = \frac{2x-5}{x-2}$

[b] 1 $P(\grave{A}) = 1 - P(A)$

$= 1 - 0.7 = 0.3$

2 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.7 + 0.6 - 0.4 = 0.9$

3 $P(A - B) = P(A) - P(A \cap B)$

$= 0.7 - 0.4 = 0.3$

12 Beni Suef

1

1 d   2 a   3 b   4 c   5 c   6 a

2

[a] $\because f(x) = (x-3)(x+3)$

$\therefore z(f) = \{3 , -3\}$

[b] 1 The probability of occurrence of the event A only $= P(A - B) = P(A) - P(A \cap B)$

$= 0.7 - 0.2 = 0.5$

2 $P(\grave{B}) = 1 - P(B)$

$= 1 - 0.3 = 0.7$

3 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.7 + 0.3 - 0.2 = 0.8$

3

[a] $\because x^2 + y^2 = 5$ (1)

, $\because x - y = 1$

$\therefore x = 1 + y$ (2)

Substituting from (2) in (1) :

$\therefore (1+y)^2 + y^2 = 5$

$\therefore 1 + 2y + y^2 + y^2 - 5 = 0$

$\therefore 2y^2 + 2y - 4 = 0$

$\therefore y^2 + y - 2 = 0$

$\therefore (y-1)(y+2) = 0$

$\therefore y = 1$ or $y = -2$

Substituting in (2) :

$\therefore x = 2$ or $x = -1$

$\therefore$ The S.S. $= \{(2 , 1) , (-1 , -2)\}$

[b] $\because n(x) = \frac{x(x+2)}{(x-2)(x^2+2x+4)} \div \frac{x+2}{x^2+2x+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -2\}$

, $n(x) = \frac{x(x+2)}{(x-2)(x^2+2x+4)} \times \frac{x^2+2x+4}{x+2}$

$= \frac{x}{x-2}$

4

[a] $\because x^2 - 6x + 7 = 0$

$\because a = 1 , b = -6 , c = 7$

$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 7}}{2 \times 1} = \frac{6 \pm 2\sqrt{2}}{2} = 3 \pm \sqrt{2}$

$\therefore$ The S.S. $= \{3 + \sqrt{2} , 3 - \sqrt{2}\}$

[b] $\because n_1(x) = \frac{(x-2)(x+2)}{(x+3)(x-2)}$

$\therefore$ Domain of $n_1 = \mathbb{R} - \{-3 , 2\}$

, $n_1(x) = \frac{x+2}{x+3}$

, $\because n_2(x) = \frac{x(x-3)(x+2)}{x(x-3)(x+3)}$

$\therefore$ Domain of $n_2 = \mathbb{R} - \{0 , 3 , -3\}$

, $n_2(x) = \frac{x+2}{x+3}$

$\therefore n_1(x) = n_2(x)$

For all the values of $x \in \mathbb{R} - \{0 , 2 , 3 , -3\}$

5

[a] $\because$ The S.S. $= \{-1 , 1\}$

$\therefore a \times (-1)^2 + b \times (-1) + 4 = 0$

$\therefore a - b = -4$ (1)

, $a \times (1)^2 + b \times 1 + 4 = 0$

$\therefore a + b = -4$ (2)

Adding (1) and (2) :

$\therefore 2a = -8$ $\therefore a = -4$

Substituting in (1) :

$\therefore b = 0$

[b] $\because n(x) = \frac{(x-3)(x+1)}{x(x-3)} + \frac{2x-1}{x(2x-1)(x-1)}$

$\therefore$ The domain of $n = \mathbb{R} - \left\{0, 3, \frac{1}{2}, 1\right\}$

, $n(x) = \frac{x+1}{x} + \frac{1}{x(x-1)} = \frac{(x+1)(x-1)+1}{x(x-1)}$

$= \frac{x^2-1+1}{x(x-1)} = \frac{x^2}{x(x-1)} = \frac{x}{x-1}$

, $n(0)$ is undefined because $0 \notin$ the domain of n

, $n(-1) = \frac{-1}{-1-1} = \frac{1}{2}$

13 Assiut

1

1 a　2 c　3 a　4 d　5 b　6 b

2

[a] Let the two numbers be x and y

$\because x + y = 9$ (1)

, $x - y = 5$ (2)

Adding (1) and (2) :

$\therefore 2x = 14$　$\therefore x = 7$

Substituting in (1) : $\therefore$ y = 2

$\therefore$ the two numbers are : 7 and 2

[b] $\because n(x) = \frac{3x-9}{x^2-5x+6} + \frac{2x+6}{x^2+x-6}$

$= \frac{3(x-3)}{(x-2)(x-3)} + \frac{2(x+3)}{(x+3)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, 3, -3\}$

, $n(x) = \frac{3}{x-2} + \frac{2}{x-2} = \frac{5}{x-2}$

3

[a] $\because \frac{x}{3} = \frac{1}{5-x}$　$\therefore x(5-x) = 3$

$\therefore 5x - x^2 = 3$

$\therefore x^2 - 5x + 3 = 0$

$\therefore a = 1, b = -5, c = 3$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2 \times 1} = \frac{5 \pm \sqrt{13}}{2}$

$\therefore x \simeq 4.3$ or $x \simeq 0.7$

$\therefore$ The S.S. $= \{4.3, 0.7\}$

[b] $\because n(x) = \frac{(x-2)(x-1)}{(x-2)(x^2+2x+4)} \div \frac{x-1}{x^2+2x+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, 1\}$

, $n(x) = \frac{x-1}{x^2+2x+4} \times \frac{x^2+2x+4}{x-1} = 1$

4

[a] $\because x + y = 2$　$\therefore y = 2 - x$ (1)

, $\frac{1}{x} + \frac{1}{y} = 2$　$\therefore x + y = 2xy$

$\therefore x + y - 2xy = 0$ (2)

Substituting from (1) in (2) :

$\therefore x + 2 - x - 2x(2-x) = 0$

$\therefore 2 - 4x + 2x^2 = 0$

$\therefore x^2 - 2x + 1 = 0$

$\therefore (x-1)^2 = 0$　$\therefore x = 1$

Substituting in (1) : $\therefore$ y = 1

$\therefore$ The S.S. $= \{(1, 1)\}$

[b] 1 $\because n(x) = \frac{x(x-2)}{(x-2)(x^2+6)}$

$\therefore n^{-1}(x) = \frac{(x-2)(x^2+6)}{x(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 2\}$

, $n^{-1}(x) = \frac{x^2+6}{x}$

2 $\because n^{-1}(x) = 5$

$\therefore \frac{x^2+6}{x} = 5$

$\therefore x^2 + 6 = 5x$

$\therefore x^2 - 5x + 6 = 0$

$\therefore (x-3)(x-2) = 0$

$\therefore x = 3$ or $x = 2$ (refused)

5

[a] $\because$ The domain of $n = \mathbb{R} - \{0, 4\}$

$\therefore$ At $x = 4$　$\therefore x + a = 0$

$\therefore 4 + a = 0$　$\therefore a = -4$

$\therefore n(x) = \frac{b}{x} + \frac{9}{x-4}$

, $\because n(5) = 2$　$\therefore \frac{b}{5} + \frac{9}{5-4} = 2$

$\therefore \frac{b}{5} + 9 = 2$　$\therefore \frac{b}{5} = -7$

$\therefore b = -35$

$\therefore a + b = -4 - 35 = -39$

[b] 1 $\because$ A , B are two mutually exclusive events.

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B)$

$\therefore 0.8 = 0.5 + x$

$\therefore x = 0.3$

2 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore 0.8 = 0.5 + x - 0.1$

$\therefore x = 0.4$

14 Qena

1

1 d 2 a 3 a 4 b 5 d 6 d

2

[a] $\because x y = 4$ (1)

$, x + y = 5$

$\therefore x = 5 - y$ (2)

Substituting from (2) in (1) :

$\therefore (5 - y) y = 4$ $\therefore 5y - y^2 = 4$

$\therefore y^2 - 5y + 4 = 0$

$\therefore (y - 4)(y - 1) = 0$

$\therefore y = 4$ or $y = 1$

Substituting in (2) :

$\therefore x = 1$ or $x = 4$

$\therefore$ The S.S. $= \{(1, 4), (4, 1)\}$

[b] $\because n(x) = \frac{(x+4)(x-3)}{(x+1)(x+4)}$

$\therefore n^{-1}(x) = \frac{(x+1)(x+4)}{(x+4)(x-3)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{-4, 3, -1\}$

$, n^{-1}(x) = \frac{x+1}{x-3}$

$, n^{-1}(0) = \frac{0+1}{0-3} = -\frac{1}{3}$

3

[a] $\because x^2 - 6x + 4 = 0$

$\therefore a = 1$, $b = -6$, $c = 4$

$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 4}}{2 \times 1} = \frac{6 \pm 2\sqrt{5}}{2} = 3 \pm \sqrt{5}$

$\therefore x \simeq 5.24$ or $x \simeq 0.76$

$\therefore$ The S.S. $= \{5.24, 0.76\}$

[b] $\because f(x) = \frac{x^2}{x^2(x-3)}$

$\therefore$ The domain of $f = \mathbb{R} - \{0, 3\}$
$, f(x) = \frac{1}{x-3}$ (1)

$, \because m(x) = \frac{x}{x(x-3)}$

$\therefore$ The domain of $m = \mathbb{R} - \{0, 3\}$
$, m(x) = \frac{1}{x-3}$ (2)

From (1) and (2) : $\therefore f = m$

4

[a] $\because n(x) = \frac{x-3}{(x-3)(x+3)} + \frac{(x-4)(x+2)}{(x+2)(x+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -3, -2\}$

$n(x) = \frac{1}{x+3} + \frac{x-4}{x+3} = \frac{1+x-4}{x+3} = \frac{x-3}{x+3}$

[b] Let the length be ℓ cm. and the width be w cm.

$, \because \ell = 2w$ (1)

$, 2(\ell + w) = 18$ cm.

$\therefore \ell + w = 9$ cm (2)

Substituting from (1) in (2) :

$\therefore 2w + w = 9$

$\therefore 3w = 9$

$\therefore w = 3$

Substituting in (1) :

$\therefore \ell = 6$

$\therefore$ The length = 6 cm. and the width = 3 cm.

$\therefore$ Its area $= \ell \times w = 6 \times 3 = 18$ cm^2.

5

[a] 1 $P(B) = 1 - P(\grave{B}) = 1 - \frac{1}{2} = \frac{1}{2}$

2 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= \frac{1}{3} + \frac{1}{2} - \frac{1}{5} = \frac{19}{30}$

3 $P(B - A) = P(B) - P(A \cap B)$
$= \frac{1}{2} - \frac{1}{5} = \frac{3}{10}$

[b] $\because n(x) = \frac{(x-1)(x^2+x+1)}{(x-1)^2} \times \frac{2(x-1)}{x^2+x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

$, n(x) = 2$

15 Matrouh

1

1 b 2 d 3 b 4 a 5 c 6 d

2

[a] $\because x - y = 5$ (1)

$, 2x + y = 7$ (2)

Adding (1) and (2) :

$\therefore 3x + 12$ $\therefore x = 4$

Substituting in (1) : $\therefore y = -1$

$\therefore$ The S.S. $= \{(4, -1)\}$

[b] $\because n(x) = \frac{x(x-2)}{(x-2)(x+2)} + \frac{2(x+3)}{(x+3)(x+2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -2, -3\}$

$, n(x) = \frac{x}{x+2} + \frac{2}{x+2}$

$= \frac{x+2}{x+2} = 1$

, n (2) is undefined because $2 \notin$ the domain of n

3

[a] $\because n_1(x) = \frac{3x}{3(x+3)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{-3\} \\ , n_1(x) = \frac{x}{x+3}\end{array}\right\}(1)$

$, \because n_2(x) = \frac{x(x+3)}{(x+3)^2}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2\ \mathbb{R} - \{-3\} \\ , n_2 = \frac{x}{x+3}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because \frac{y}{x} = 1$ $\therefore x = y$ (1)

$, x^2 + xy + y^2 = 12$ (2)

Substituting from (1) in (2) :

$\therefore y^2 + y^2 + y^2 = 12$ $\therefore 3y^2 = 12$

$\therefore y^2 = 4$

$\therefore y = 2$ or $y = -2$

Substituting in (1) :

$\therefore x = 2$ or $x = -2$

$\therefore$ The S.S. $= \{(2, 2), (-2, -2)\}$

4

[a] $\because x^2 - 5x + 2 = 0$

$\therefore a = 1, b = -5, c = 2$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times (2)}}{2 \times 1} = \frac{5 \pm \sqrt{17}}{2}$

$\therefore x \simeq 4.56$ or $x \simeq 0.44$

$\therefore$ The S.S. $= \{4.56, 0.44\}$

[b] $\because n(x) = \frac{x(x-3)}{(x-3)(x^2+3x+9)} \div \frac{2x}{x^2+3x+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, 0\}$

$, n(x) = \frac{x}{x^2+3x+9} \times \frac{x^2+3x+9}{2x} = \frac{1}{2}$

5

[a] 1 $\because n(x) = \frac{x(x-2)}{x-2}$

$\therefore n^{-1}(x) = \frac{x-2}{x(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 2\}$

$, n^{-1}(x) = \frac{1}{x}$

2 $\because n^{-1}(x) = 4$

$\therefore \frac{1}{x} = 4$ $\therefore x = \frac{1}{4}$

[b] $\because P(A) = 1 - P(\grave{A}) = 1 - 0.6 = 0.4$

1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.4 + 0.5 - 0.2 = 0.7$

2 $P(A - B) = P(A) - P(A \cap B)$

$= 0.4 - 0.2 = 0.2$

Answers of Port Said examinations of algebra and probability

Exam 1 Port Said 2024

First Answers of multiple choice questions

1 (d) 2 (c) 3 (a) 4 (d) 5 (c)
6 (b) 7 (a) 8 (b) 9 (c) 10 (a)
11 (d) 12 (b) 13 (c) 14 (c) 15 (b)
16 (b) 17 (c) 18 (d) 19 (a) 20 (d)
21 (b)

Second Answers of essay questions

22

$\because x^2 - 4x + 1 = 0$

$\therefore a = 1 \ , \ b = -4 \ , \ c = 1$

$$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{4 \pm \sqrt{12}}{2} = \frac{4 \pm 2\sqrt{3}}{2} = 2 \pm \sqrt{3}$$

$\therefore x \simeq 3.7$ or $x \simeq 0.3$

$\therefore$ The S.S $= \{3.7 \ , 0.3\}$

23

$\because n(x) = \frac{5x}{x-3} - \frac{15}{x-3}$

$\therefore$ The domain of $n = \mathbb{R} - \{3\}$

$, n(x) = \frac{5x - 15}{x-3} = \frac{5(x-3)}{x-3} = 5$

24

$\because n(x) = \frac{x-2}{(x-1)(x-2)}$

$\therefore n^{-1}(x) = \frac{(x-1)(x-2)}{x-2}$

$\therefore$ the domain of $n^{-1} = \mathbb{R} - \{1 \ , 2\}$

$, n^{-1}(x) = x - 1$

Exam 2 Port Said 2023

First Answers of multiple choice questions

1 (a) 2 (c) 3 (b) 4 (b) 5 (c)
6 (d) 7 (c) 8 (d) 9 (c) 10 (a)
11 (b) 12 (b) 13 (a) 14 (c) 15 (b)
16 (d) 17 (a) 18 (b) 19 (d) 20 (d)
21 (b)

Second Answers of essay questions

22

$\because x = 3$ (1) $, x y = 6$ (2)

Substituting from (1) in (2) :

$\therefore 3y = 6 \qquad \therefore y = 2$

$\therefore$ The S.S. $= \{(3 \ , 2)\}$

23

$\because n(x) = \frac{x-3}{(x-3)(x-4)} + \frac{x-5}{x-4}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 \ , 4\}$

$, n(x) = \frac{1}{x-4} + \frac{x-5}{x-4} = \frac{x-4}{x-4} = 1$

24

$\because n(x) = \frac{(x-3)(x-2)}{(x-3)(x+3)}$

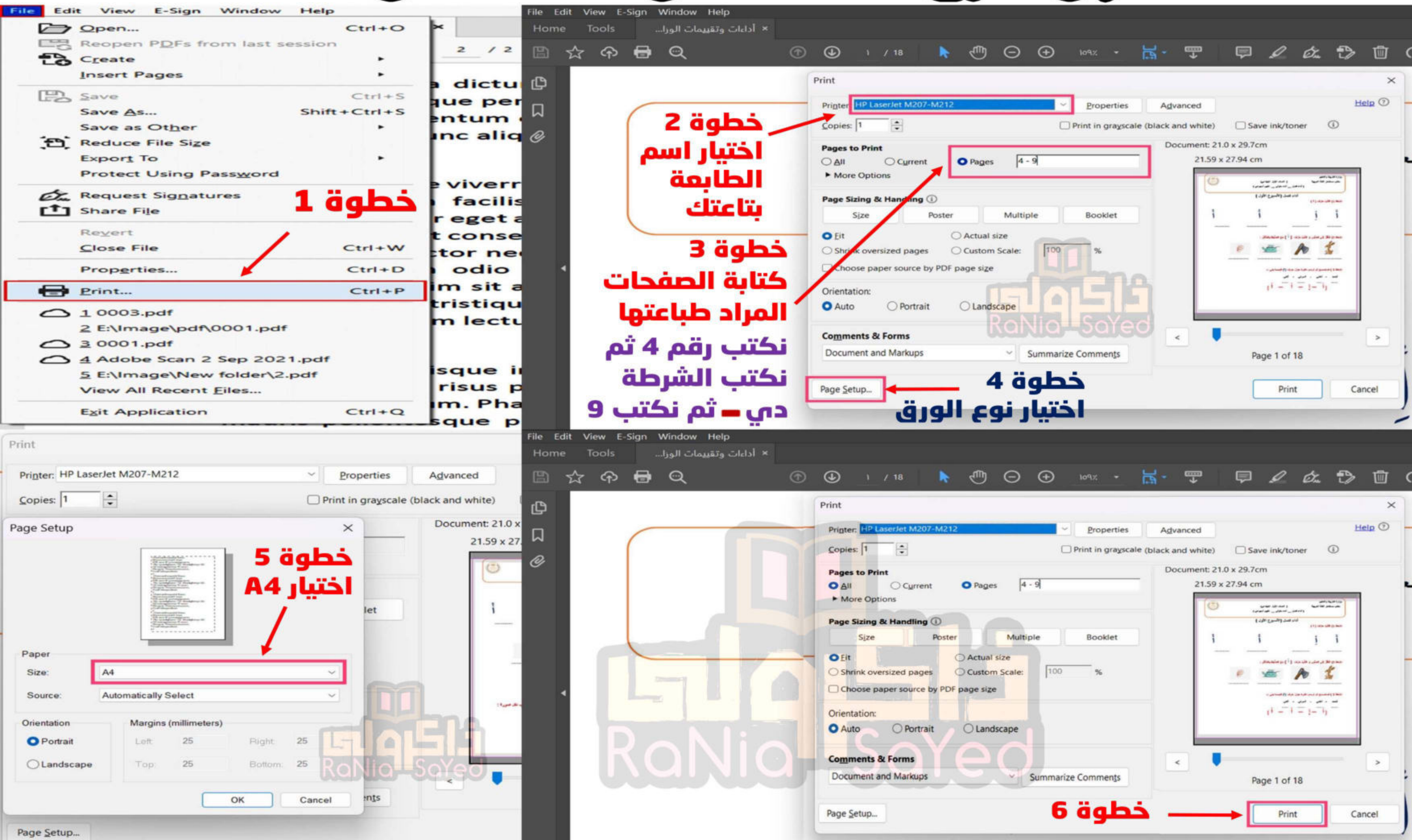
$\therefore n^{-1}(x) = \frac{(x-3)(x+3)}{(x-3)(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2 \ , 3 \ , -3\}$

$, n^{-1}(x) = \frac{x+3}{x-2}$

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9



امتحانات رقم (2)

الترم الثانى

1 Ismailia Governorate

Answer the following questions : *(Calculator is permitted)*

1 Choose the correct answer from those given answers :

1 If $|x| = 5$, then $x =$ ....

(a) 5 (b) -5 (c) ± 5 (d) 10

2 The domain of the algebraic fraction $\frac{x-5}{7}$ equals the domain of the algebraic fraction ....

(a) $\frac{x}{x-2}$ (b) $\frac{x^2+4}{7x}$ (c) $\frac{x}{x-5}$ (d) $\frac{7}{x^2+4}$

3 If the probability to success in the preparatory certificate exam is 85 %, then the probability to fail is ....

(a) $\frac{3}{200}$ (b) $\frac{3}{20}$ (c) $\frac{17}{20}$ (d) 0.85

4 If $y^{-3} = 8$, then $y =$ ....

(a) $\frac{1}{8}$ (b) 2 (c) $\frac{1}{512}$ (d) $\frac{1}{2}$

5 If the two equations : $x + 2y = 3$, $3x + ky = 9$ have an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then $k =$ ....

(a) 2 (b) 3 (c) 6 (d) 9

6 If $x + 3y = 7$, then $x + 3(y + 5) =$ ....

(a) 22 (b) 12 (c) 7 (d) 35

---

2 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations algebraically : $y = 2x$, $x^2 + y^2 = 20$

[b] Find n (x) in the simplest form, showing the domain where :

$$n(x) = \frac{(x-2)^3}{x^3-8} \times \frac{x^2+2x+4}{x^2-4}$$

---

3 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations algebraically : $x + 2y = 8$, $3x + y = 9$

[b] Find n (x) in the simplest form, showing the domain where :

$$n(x) = \frac{x^2+3x}{x^2+4x+3} + \frac{x-5}{x^2-4x-5}$$

---

4 [a] Using the general formula, find in $\mathbb{R}$ the solution set of the equation :

$x(x+3) = 1$ (rounding the result to the nearest one decimal place)

[b] If $n(X) = \frac{X-5}{X-1}$, **find :**

1 $n^{-1}(X)$ and identify the domain of n^{-1}

2 The value of X if $n(X) = 3$

5 [a] If $n_1(X) = \frac{X^2+X-12}{X^2+5X+4}$, $n_2(X) = \frac{(X-3)(X+1)}{X^2+2X+1}$

, **prove that :** $n_1(X) = n_2(X)$ for all values of X which belong to the common domain.

[b] If A and B are two events from the sample space of a random experiment

, $P(A) = 0.7$, $P(B) = 0.4$, $P(A \cup B) = 0.8$, **find :**

1 $P(\grave{B})$ 2 $P(A \cap B)$ 3 $P(A - B)$

2 El-Beheira Governorate

Answer the following questions : *(Calculator is permitted)*

1 **Choose the correct answer from the given ones :**

1 If A and B are two mutually exclusive events of a random experiment , $P(A) = 0.2$, $P(A \cup B) = 0.7$, then $P(B) = $ ....

(a) zero (b) 1 (c) 0.5 (d) 0.9

2 The set of zeroes of the function $f : f(X) = (X-1)^2 (X+2)$ is ....

(a) $\{1, 2\}$ (b) $\{1, -2\}$ (c) $\{-1, 2\}$ (d) $\{-1, -2, 1\}$

3 The two straight lines : $X + 5y = 1$, $X + 5y - 8 = 0$ are ....

(a) coincident. (b) parallel.

(c) perpendicular. (d) intersecting and non perpendicular.

4 If $\sqrt{16+9} = 4 + X$, then $X = $ ....

(a) 3 (b) 4 (c) 5 (d) 1

5 If X is a negative number , then the greatest number of the following is ....

(a) $5X$ (b) $5 + X$ (c) $5 - X$ (d) $\frac{5}{X}$

6 $\frac{1}{X} + \frac{1}{y} + \frac{1}{Xy} = \frac{\text{..............}}{Xy}$ (where $X \neq$ zero , $y \neq$ zero)

(a) 2 (b) 3 (c) $X + y$ (d) $X + y + 1$

2 [a] **Find algebraically the solution set of the two equations in** $\mathbb{R} \times \mathbb{R}$ **:** $y = X + 4$, $X + y = 4$

[b] **Find** $n(X)$ **in the simplest form , showing the domain of n :** $n(X) = \frac{X}{X-4} - \frac{X+4}{X^2-16}$

3 [a] **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

$x^2 = 2(x + 6)$ (rounding the results to two decimal places)

[b] **Find n (x) in the simplest form , showing the domain of n :**

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \times \frac{x + 3}{x^2 + 2x + 4}$$

---

4 [a] If $n_1(x) = \dfrac{x^2}{x^3 - x^2}$, $n_2(x) = \dfrac{x^3 + x^2 + x}{x^4 - x}$, **then prove that :** $n_1 = n_2$

[b] **Find algebraically the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:**

$x = y + 1$, $(x - y)^2 + y = 3$

---

5 [a] If $n(x) = \dfrac{x - 2}{x^2 - 5x + 6}$, **then find :** $n^{-1}(x)$, showing the domain of n^{-1}

[b] A box contains 15 identical cards numbered from 1 to 15 , a card is drawn randomly.

Find the probability that the number on the card is :

1 divisible by 3   2 an odd number and divisible by 3

3 Beni Suef Governorate

Answer the following questions : *(Calculator is permitted)*

1 Choose the correct answer from those given :

1 $\mathbb{Q} \cup \grave{\mathbb{Q}} =$ ....

(a) $\mathbb{R}$ (b) $\mathbb{Q}$ (c) $\mathbb{Z}$ (d) $\varnothing$

2 If there are an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$x + 3y = 2$, $2x + my = 4$, then m = ...

(a) 2   (b) 3   (c) 4   (d) 6

3 $(-1)^{15}$ .... $(-1)^8$

(a) $\geq$ (b) $>$ (c) $<$ (d) $=$

4 If A and B are two mutually exclusive events from the sample space of a random experiment , then P (A – B) = ...

(a) P (A)   (b) P (B)   (c) $P(\grave{A})$ (d) $P(\grave{B})$

5 If $\sqrt{16 + 9} = 4 + a$, then a = ...

(a) zero   (b) 1   (c) 2   (d) 3

6 The set of zeroes of the function $f : f(x) = \dfrac{x + 1}{x^2 - 1}$ is ....

(a) $\{1 , -1\}$ (b) $\{1\}$ (c) $\{-1\}$ (d) $\varnothing$

2 [a] **Find n ($\mathcal{X}$) in the simplest form , showing the domain of the function n where :**

$$n(\mathcal{X}) = \frac{\mathcal{X}^2 + 2\mathcal{X}}{\mathcal{X}^2 - 4} + \frac{\mathcal{X} + 3}{\mathcal{X}^2 + \mathcal{X} - 6}$$

[b] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $2\mathcal{X} + y = 1$ and $\mathcal{X} + 2y = 5$

---

3 [a] If the domain of the function $f : f(\mathcal{X}) = \frac{\mathcal{X} + 1}{\mathcal{X}^2 - a\mathcal{X} + 25}$ is $\mathbb{R} - \{5\}$

, then find : the value of a

[b] **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

$3\mathcal{X}^2 = 5\mathcal{X} - 1$ (rounding the result to two decimal places)

---

4 [a] **Find n ($\mathcal{X}$) in the simplest form , showing the domain of the function n where :**

$n(\mathcal{X}) = \frac{2\mathcal{X} - 4}{\mathcal{X}^3 - 8} \div \frac{\mathcal{X} + 2}{\mathcal{X}^2 + 2\mathcal{X} + 4}$, then find n (0) if possible.

[b] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $\mathcal{X} - y = 0$ and $\mathcal{X}^2 + \mathcal{X}y + y^2 = 27$

---

5 [a] If $n_1(\mathcal{X}) = \frac{\mathcal{X} + 5}{\mathcal{X}^2 + 4\mathcal{X} - 5}$ and $n_2(\mathcal{X}) = \frac{2\mathcal{X} - 1}{2\mathcal{X}^2 - 3\mathcal{X} + 1}$

, then prove that : $n_1(\mathcal{X}) = n_2(\mathcal{X})$ for all values of $\mathcal{X}$ which belong to the common domain and find this domain.

[b] If A and B are two events from the sample space of a random experiment

, P (A) = 0.4 , P (B) = 0.5 and P (A ∪ B) = 0.8 , **find :**

1 P (A ∩ B)   2 The probability of non-occurrence of the event A

4 El-Menia Governorate

Answer the following questions :

1 **Choose the correct answer from the given answers :**

1 If $\mathcal{X}y = 5$, $\mathcal{X}y^2 = 20$, then y = ...

(a) 2   (b) – 2   (c) ± 2   (d) 4

2 If $\mathcal{X}^3 + 8 = (\mathcal{X} + 2)(\mathcal{X}^2 + k\mathcal{X} + 4)$, then k = ...

(a) – 2   (b) 2   (c) – 4   (d) 4

3 If $y^2 - k = (y - 3)(y + 3)$, then k = ...

(a) 9   (b) – 6   (c) – 9   (d) 6

4 The number of solutions of the two equations : $\mathcal{X} + y = 2$ and $4 - 2\mathcal{X} = 2y$ together is ....

(a) zero   (b) 1   (c) 2   (d) an infinite number.

5 The set of zeroes of the function f where $f(X) = X^2 + 9$ is ....

(a) $\mathbb{R}$ (b) $\{3, -3\}$ (c) $\mathbb{R} - \{3, -3\}$ (d) $\varnothing$

6 If $X \subset Y$, then $P(X \cap Y) =$ ....

(a) X (b) Y (c) P (X) (d) P (Y)

---

2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $2y = 3 + X$, $2X = 4 - y$

[b] If the domain of n : $n(X) = \dfrac{X - 3}{X^2 + bX + 3}$ is $\mathbb{R} - \{1, 3\}$ **, then find :** the value of b

---

3 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $X + y = 0$ and $X^2 + y^2 = 2$

[b] If $n_1(X) = \dfrac{X - 2}{X^2 - 4X + 4}$, $n_2(X) = \dfrac{1}{X - 2}$

, prove that : $n_1(X) = n_2(X)$ for all the values of X belonging to the common domain.

---

4 [a] **Find in $\mathbb{R}$ the solution set of the equation :** $X^2 + 1 = 3X$ rounding the results to two decimal places.

[b] **Find n (X) in the simplest form , showing the domain :** $n(X) = \dfrac{X + 2}{X^2 - 4} + \dfrac{2X}{2X - 4}$

---

5 [a] If A and B are two mutually exclusive events , $P(B) = 0.3$, $P(A \cup B) = 0.8$ **, then find :**

1 $P(A \cap B)$ 2 $P(A)$

[b] **Find n (X) in the simplest form , showing the domain of n :**

$n(X) = \dfrac{X^2 + 2X}{X^3 + 8} \div \dfrac{2X}{X^2 - 2X + 4}$

5 Assiut Governorate

Answer the following questions : ***(Calculator is permitted)***

1 **Choose the correct answer :**

1 If the solution set of the two equations : $X + 2y = 5$, $2X + ky = 3$ in $\mathbb{R} \times \mathbb{R}$ equals $\varnothing$, then k = ...

(a) 2 (b) -2 (c) 4 (d) -4

2 If $0.0043 = 4.3 \times 10^{X}$, then $X =$ ....

(a) -4 (b) -3 (c) 4 (d) 3

3 If $n_1 = n_2$, $n_1(X) = \dfrac{5X}{5X^2 + 20}$, then $n_2(X) =$ ....

(a) $\dfrac{X}{X^2 - 4}$ (b) $\dfrac{X}{X^2 + 4}$ (c) $\dfrac{X^2 + 4}{X}$ (d) $\dfrac{X^2 - 4}{X}$

4 If $A \subset S$ of a random experiment and $P(A) + P(\acute{A}) = 2k$, then k = ...

(a) 1 (b) $\dfrac{1}{2}$ (c) $\dfrac{1}{3}$ (d) $\dfrac{1}{4}$

5 If $\sqrt{x+9}=5$, then $\sqrt{x}=$ ....

(a) 4 (b) 16 (c) 25 (d) -4

6 If $b+|-9|=$ zero , then $b=$ ....

(a) 9 (b) -9 (c) ± 9 (d) zero

---

2 [a] **Find in $\mathbb{R}$ the solution set of the equation :** $x(x+8)+9=0$ by using the general formula , rounding the result to one decimal place.

[b] **Find n (x) in the simplest form , showing the domain of n , where :**

$$n(x)=\frac{x^2+4x+3}{x^3-27}\div\frac{x+3}{x^2+3x+9}$$

---

3 [a] **Find in $\mathbb{R}\times\mathbb{R}$ the solution set of the two equations :** $x-y=1$, $x^2+y^2=25$

[b] If $n(x)=\frac{x^2-x}{x^2-1}+\frac{x+5}{x^2+6x+5}$, find n (x) in the simplest form , showing the domain of n

---

4 [a] **Find in $\mathbb{R}\times\mathbb{R}$ the solution set of the two equations algebraically :**

$2x-y=3$, $x+2y=4$

[b] If $n(x)=\frac{x^2-2x}{x^2-3x+2}$, **find if possible :**

1 $n^{-1}(x)$ in the simplest form , showing the domain of n^{-1}

2 $n^{-1}(2)$

---

5 [a] **Find the common domain for the two functions n_1 , n_2 where :**

$$n_1(x)=\frac{x-4}{x^2-5x+6} \quad , \quad n_2(x)=\frac{2x}{x^3-9x}$$

[b] If A and B are two events from the sample space of a random experiment , $P(A)=\frac{1}{2}$, $P(B)=\frac{1}{3}$ **, find P (A ∪ B) in each of the following cases :**

1 $P(A\cap B)=\frac{1}{8}$ 2 A and B are mutually exclusive events.

6 Qena Governorate

محافظة قنا

Answer the following questions : *(Calculator is permitted)*

1 Choose the correct answer from those given :

1 The solution set of the two equations : $x=3$, $y=4$ in $\mathbb{R}\times\mathbb{R}$ is ....

(a) $\{(3,4)\}$ (b) $\{(4,3)\}$ (c) $\mathbb{R}$ (d) $\varnothing$

2 If $a-b=3$, then $a^2-2ab+b^2=$ ....

(a) 3 (b) -3 (c) 9 (d) -9

3 If $z(f) = \{2\}$, $f(x) = x^3 - m$, then $m = $ ....

(a) $\sqrt[3]{2}$ (b) 2 (c) 4 (d) 8

4 $\sqrt{x^2} = $ ....

(a) $\pm x$ (b) $|x|$ (c) $-x$ (d) x

5 If A and B are two mutually exclusive events in the sample space of a random experiment , then $P(A \cap \acute{B}) = $ ....

(a) zero (b) 1 (c) 0.5 (d) $\varnothing$

6 If $(x-2)^{\text{zero}} = 1$, then $x \neq$ ....

(a) zero (b) 1 (c) 2 (d) -2

---

2 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $x - y = 2$, $x^2 + y^2 = 20$

[b] **Find n (x) in its simplest form , showing the domain where :**

$n(x) = \dfrac{x+1}{x^2 - x - 2} \times \dfrac{x^2 + 3x - 10}{3x^2 + 16x + 5}$, then find $n(-1)$ if possible.

---

3 [a] **Using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

$x^2 - 4x + 1 = \text{zero}$ (approximate the result to the nearest two decimals)

[b] **Find n (x) in its simplest form , showing the domain of n :**

$n(x) = \dfrac{x^2 + 2x + 4}{x^3 - 8} - \dfrac{9 - x^2}{x^2 + x - 6}$

---

4 [a] Two acute angles in a right-angled triangle , the difference between their measures is 50° , find the measure of each one.

[b] If $n_1(x) = \dfrac{x^2}{x^3 - x^2}$, $n_2(x) = \dfrac{x^3 + x^2 + x}{x^4 - x}$, **prove that :** $n_1 = n_2$

---

5 [a] If the domain of the function $n : n(x) = \dfrac{(x-2)(x+1)}{x^2 - k}$ is $\mathbb{R} - \{1 , -1\}$, **find :**

1 The value of k

2 $n^{-1}(x)$ in the simplest form , show the domain of n^{-1}

[b] If A and B are two events in the sample space of a random experiment , and $P(A) = 0.3$, $P(B) = 0.6$, $P(A \cup B) = 0.7$, **find :**

1 $P(A \cap B)$ 2 $P(A - B)$ 3 $P(\acute{A})$

7 Luxor Governorate

Answer the following questions :

1 Choose the correct answer :

1 If $X^2 + k - 9 = (X - 3)(X + 3)$, then k = ...

(a) 3 (b) – 3 (c) zero (d) 9

2 Quarter of the number 2^{20} = ...

(a) 2^5 (b) 2^{18} (c) 2^{19} (d) 2^{10}

3 If the age of Ahmed now is $X + 2$ years , then his age 5 years ago is .... years.

(a) $X - 5$ (b) $X + 3$ (c) $5X$ (d) $X - 3$

4 The number of solutions of the two equations : $X + y = 4$, $3X + 3y = 7$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1 (c) 2 (d) an infinite number.

5 The set of zeroes of the function $f : f(X) = 4$ is ....

(a) $\{4\}$ (b) $\{-4\}$ (c) $\varnothing$ (d) $\{4, -4\}$

6 If A and B are two events of the sample space of a random experiment and $A \subset B$, then $P(A \cup B)$ = ...

(a) P (A) (b) P (B) (c) zero (d) $P(A \cap B)$

---

2 [a] **Find algebraically in $\mathbb{R} \times \mathbb{R}$ the S.S. of the two equations :** $2X - y = 3$, $X + 2y = 4$

[b] **Find n (X) in the simplest form , showing the domain :**

$n(X) = \frac{X^2 + 2X}{X^3 - 27} \div \frac{X + 2}{X^2 + 3X + 9}$, **then find :** n (2) , n (– 2) if possible.

---

3 [a] **Find in $\mathbb{R}$ the solution set of the equation :** $X^2 - 2X = 6$ (given that $\sqrt{7} = 2.65$)

[b] If $n(X) = \frac{X^2 - 4}{X^2 - 5X + 6}$, then :

1 Put n (X) in the simplest form.

2 Write the domain.

3 Find the set of zeroes of n

---

4 [a] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $y - X = 2$, $X^2 + Xy - 4 = 0$

[b] **Find n (X) in the simplest form , showing the domain :** $n(X) = \frac{X^2 + 2X + 4}{X^3 - 8} - \frac{9 - X^2}{X^2 + X - 6}$

---

5 [a] Two acute angles in a right-angled triangle , the difference between their measures is 50°

Find the measure of each angle.

[b] If A and B are two events of the sample space of a random experiment and $P(A) = 0.5$, $P(B) = X$, $P(A \cup B) = 0.8$ **, then find X if :**

1 A and B are mutually exclusive. 2 $P(A \cap B) = 0.1$

8 New Valley Governorate

Answer the following questions : ***(Calculator is allowed)***

1 Choose the correct answer from those given :

1 If A and B are two events of the sample space of a random experiment where $B \subset A$, then $P(A \cup B) = \cdots\cdots$

(a) P (B) (b) P (A) (c) $P(A \cap B)$ (d) zero

2 The set of zeroes of the function $f : f(X) = -7X$ is $\cdots\cdots$

(a) $\{-7\}$ (b) $\{7\}$ (c) $\{0\}$ (d) $\varnothing$

3 The solution set of the inequality : $4 - X < 0$ in $\mathbb{R}$ is $\cdots\cdots$

(a) $]-4 , \infty[$ (b) $]4 , \infty[$ (c) $]-\infty , -4[$ (d) $]-\infty , 4[$

4 The number of solutions of the equation : $X = 1$ in $\mathbb{R} \times \mathbb{R}$ is $\cdots\cdots$

(a) 0 (b) 1 (c) 2 (d) infinite.

5 The domain of the function $f : f(X) = X^2 - 1$ is $\cdots\cdots$

(a) $\{1\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{1 , -1\}$ (d) $\mathbb{R}$

6 If $X^2 = 7X + y$, $y^2 = X + 7y$, $X \neq y$, then $X^2 + y^2 = \cdots\cdots$

(a) 8 (b) 16 (c) 48 (d) 64

---

2 [a] Find graphically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$2X - y = 5$, $X + y = 4$, then find the surface area of the triangle bounded by the two lines (representing the equations) and the y-axis.

[b] Find n (X) in the simplest form , showing the domain where :

$$n(X) = \frac{X + 3}{X^2 + 2X + 4} \times \frac{X^3 - 8}{X^2 + X - 6}$$

---

3 [a] If $n(X) = \dfrac{X^2 - 3X}{X^2 - 4X + 3}$ **, then find :**

1 $n^{-1}(X)$ in the simplest form , showing the domain.

2 The value of X if $n^{-1}(X) = 2$

[b] Find the solution set of the two equations : $y - X = 2$, $Xy + y^2 = 4$ in $\mathbb{R} \times \mathbb{R}$

4 [a] **Using the general formula , find in $\mathbb{R}$ the solution set of the equation :** $2x^2 = 1 + 5x$ (approximating the result to the nearest one decimal place)

[b] **Find n (x) in the simplest form , showing the domain where :** $n(x) = \frac{x^2 - x}{x^2 - 1} + \frac{x + 5}{x^2 + 6x + 5}$

5 [a] If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, **prove that :** $n_1 = n_2$

[b] If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A \cup B) = \frac{17}{24}$ where A and B are two events of the sample space of a random experiment , **find :**

1 $P(A \cap B)$ 2 $P(A - B)$

9 South Sinai Governorate

Answer the following questions :

1 Choose the correct answer from those given :

1 The set of zeroes of the function f where $f(x) = x^2 + 4$ in $\mathbb{R}$ is ....

(a) $\{2\}$ (b) $\{2 , -2\}$ (c) $\mathbb{R}$ (d) $\varnothing$

2 The number of solutions of the two equations : $x + y = 2$ and $y + x = 3$ together is ....

(a) zero (b) 1 (c) $\varnothing$ (d) an infinite number.

3 If $P(A) = \frac{1}{4}$, then $P(\acute{A}) =$ ....

(a) 1 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

4 The domain of the function n : $n(x) = \frac{x}{x - 1}$ is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{0 , 1\}$ (d) $\mathbb{R}$

5 If $x^3 = 64$, then $\sqrt{x} =$ ....

(a) 2 (b) ± 2 (c) 4 (d) ± 8

6 If the sum of two positive numbers is 7 and their product is 12 , then the two numbers are ....

(a) 2 , 5 (b) 2 , 6 (c) 3 , 4 (d) 1 , 6

2 [a] **Find n (x) in the simplest form , showing the domain of the function where :**

$n(x) = \frac{x - 3}{x^2 - 7x + 12} - \frac{4}{x^2 - 4x}$

[b] **By using the general formula , find in $\mathbb{R}$ the solution set of the equation :**

$2x^2 - 5x + 1 = 0$ (approximating to the nearest two decimal places)

3 [a] **Prove that :** $n_1 = n_2$ where $n_1(X) = \frac{2X}{2X+4}$ and $n_2(X) = \frac{X^2+2X}{X^2+4X+4}$

[b] **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :** $X - y = 0$ and $X^2 + Xy + y^2 = 27$

4 [a] **Solve the following two equations in $\mathbb{R} \times \mathbb{R}$:** $2X - y = 3$, $X + 2y = 4$

[b] **Simplify to the simplest form , showing the domain :** $n(X) = \frac{X^3-8}{X^2+X-6} \times \frac{X+3}{X^2+2X+4}$

5 [a] If $n(X) = \frac{X^2-2X}{X^2-3X+2}$ **, find :**

1. $n^{-1}(X)$ in the simplest form , showing the domain of n^{-1}
2. The value of X if $n^{-1}(X) = 3$

[b] If A and B are two events from the sample space of a random experiment and $P(A) = 0.3$, $P(B) = 0.6$, $P(A \cap B) = 0.2$ **, find :**

1. $P(A \cup B)$
2. $P(\acute{B})$

10 Red Sea Governorate

Answer the following questions :

1 **Choose the correct answer from the given answers :**

1. If the two equations : $X + 4y = 7$ and $3X + ky = 21$ have an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then k = ...
   (a) 4 (b) 7 (c) 12 (d) 21
2. The domain of the function $f : f(X) = X - 3$ is ....
   (a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{-3\}$ (c) $\{zero\}$ (d) $\mathbb{R}$
3. The additive inverse of $|-3|$ is ....
   (a) 3 (b) -3 (c) ± 3 (d) $\frac{1}{3}$
4. The set of zeroes of the function $f : f(X) = \frac{X^2-9}{X-2}$ is ....
   (a) $\{2\}$ (b) $\mathbb{R} - \{2\}$ (c) $\{3, -3\}$ (d) $\{3, 2, -3\}$
5. If A and B are two mutually exclusive events in a random experiment , then $P(A - B) =$ ....
   (a) $P(A)$ (b) $P(B)$ (c) $P(\grave{A})$ (d) $\varnothing$
6. If $f(X) = 3$, then $f(-1) =$ ....
   (a) 1 (b) 3 (c) -1 (d) -3

2 [a] **Find the solution set of the two equations :** $X + y = 4$, $2X - y = 2$ in $\mathbb{R} \times \mathbb{R}$

[b] If $n_1(X) = \frac{X^2+3X+2}{X^2-4}$, $n_2(X) = \frac{X^2-1}{X^2-3X+2}$

, **prove that :** $n_1(X) = n_2(X)$ for all values of X which belong to the common domain , then find the common domain.

3 [a] **Find n (x) in its simplest form , showing the domain where :**

$$n(x) = \frac{x^3 - 8}{x^2 - 3x + 2} \times \frac{x + 1}{x^2 + 2x + 4}$$

[b] **Find the solution set of the equation :** $x^2 - 2x - 6 = 0$ in $\mathbb{R}$ using the general rule , rounding the results to the nearest one decimal place.

---

4 [a] **Solve the two equations :** $x - y = 1$, $x^2 - y^2 = 25$ in $\mathbb{R} \times \mathbb{R}$

[b] **Find n (x) in its simplest form , showing the domain where :** $n(x) = \frac{x^2 + x}{x^2 - 1} - \frac{x + 5}{x^2 + 4x - 5}$

---

5 [a] If $n(x) = \frac{2x - 4}{x^2 - 4}$ **, find in the simplest form :** $n^{-1}(x)$, showing the domain of n^{-1}

[b] If A and B are two events from the sample space of a random experiment and

$P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$

, find : 1 $P(A \cup B)$ 2 $P(A - B)$

3 $P(\grave{A})$

1 Ismailia

1 1 c 2 d 3 b
4 d 5 c 6 a

2

[a] $\because y = 2x$ (1)

$, x^2 + y^2 = 20$ (2)

Substituting from (1) in (2) :

$\therefore x^2 + (2x)^2 = 20$ $\therefore x^2 + 4x^2 = 20$

$\therefore 5x^2 = 20$ $\therefore x^2 = 4$

$\therefore x = 2$ or $x = -2$

Substituting in (1) : $\therefore y = 4$ or $y = -4$

$\therefore$ The S.S. $= \{(2 , 4) , (-2 , -4)\}$

[b] $\because n(x) = \frac{(x-2)^3}{(x-2)(x^2+2x+4)} \times \frac{x^2+2x+4}{(x+2)(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -2\}$

$, n(x) = \frac{x-2}{x+2}$

3

[a] $\because x + 2y = 8$ $\therefore x = 8 - 2y$ (1)

$, 3x + y = 9$ (2)

Substituting from (1) in (2) :

$\therefore 3(8 - 2y) + y = 9$

$\therefore 24 - 6y + y = 9$ $\therefore 24 - 5y = 9$

$\therefore 5y = 15$ $\therefore y = 3$

Substituting in (1) : $\therefore x = 2$

$\therefore$ The S.S. $= \{(2 , 3)\}$

[b] $\because n(x) = \frac{x(x+3)}{(x+1)(x+3)} + \frac{x-5}{(x-5)(x+1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-1 , -3 , 5\}$

$, n(x) = \frac{x}{x+1} + \frac{1}{x+1} = \frac{x+1}{x+1} = 1$

4

[a] $\because x(x+3) = 1$ $\therefore x^2 + 3x - 1 = 0$

$\therefore a = 1 , b = 3 , c = -1$

$\therefore x = \frac{-3 \pm \sqrt{(3)^2 - 4 \times 1 \times -1}}{2 \times 1} = \frac{-3 \pm \sqrt{13}}{2}$

$\therefore x \simeq 0.3$ or $x \simeq -3.3$

$\therefore$ The S.S. $= \{0.3 , -3.3\}$

[b] 1 $\because n(x) = \frac{x-5}{x-1}$ $\therefore n^{-1}(x) = \frac{x-1}{x-5}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{1 , 5\}$

2 $\because n(x) = 3$ $\therefore \frac{x-5}{x-1} = 3$

$\therefore 3x - 3 = x - 5$ $\therefore 3x - x = -5 + 3$

$\therefore 2x = -2$ $\therefore x = -1$

5

[a] $\because n_1(x) = \frac{(x-3)(x+4)}{(x+4)(x+1)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-4 , -1\}$

$, n_1(x) = \frac{x-3}{x+1}$

$, \because n_2(x) = \frac{(x-3)(x+1)}{(x+1)^2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{-1\}$

$, n_2(x) = \frac{x-3}{x+1}$

$\therefore n_1(x) = n_2(x)$ for all the values of $x \in \mathbb{R} - \{-4 , -1\}$

[b] 1 $P(\acute{B}) = 1 - P(B) = 1 - 0.4 = 0.6$

2 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.7 + 0.4 - 0.8 = 0.3$

3 $P(A - B) = P(A) - P(A \cap B) = 0.7 - 0.3 = 0.4$

2 El-Beheira

1 1 c 2 b 3 b
4 d 5 c 6 d

2

[a] $\because y = x + 4$ (1)

$, x + y = 4$ (2)

Substituting from (1) in (2) : $\therefore x + x + 4 = 4$

$\therefore 2x = 0$ $\therefore x = 0$

Substituting in (1) : $\therefore y = 4$

$\therefore$ The S.S. $= \{(0 , 4)\}$

[b] $\because n(x) = \frac{x}{x-4} - \frac{x+4}{(x-4)(x+4)}$

$\therefore$ The domain of $n = \mathbb{R} - \{4 , -4\}$

$, n(x) = \frac{x}{x-4} - \frac{1}{x-4} = \frac{x-1}{x-4}$

3

[a] $\because x^2 = 2(x + 6)$

$\therefore x^2 - 2x - 12 = 0$

$\therefore a = 1 , b = -2 , c = -12$

$\therefore X = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -12}}{2 \times 1} = \frac{2 \pm 2\sqrt{13}}{2} = 1 \pm \sqrt{13}$

$\therefore X \simeq 4.61$ or $X \simeq -2.61$

$\therefore$ The S.S. $= \{4.61 , -2.61\}$

[b] $\because n(X) = \frac{(X-2)(X^2+2X+4)}{(X-2)(X+3)} \times \frac{X+3}{X^2+2X+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -3\}$

, $n(X) = 1$

4

[a] $\because n_1(X) = \frac{X^2}{X^2(X-1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0 , 1\} \\ , n_1(X) = \frac{1}{X-1}\end{array}\right\}(1)$

$, \because n_2(X) = \frac{X(X^2+X+1)}{X(X-1)(X^2+X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0 , 1\} \\ , n_2(X) = \frac{1}{X-1}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because X = y + 1$ (1)

$, (X - y)^2 + y = 3$ (2)

Substituting from (1) in (2) :

$\therefore (y + 1 - y)^2 + y = 3$

$\therefore 1 + y = 3$ $\therefore y = 2$

Substituting in (1) : $\therefore X = 3$

$\therefore$ The S.S. $= \{(3 , 2)\}$

5

[a] $\because n(X) = \frac{X-2}{(X-2)(X-3)}$

$\therefore n^{-1}(X) = \frac{(X-2)(X-3)}{X-2}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2 , 3\}$

$, n^{-1}(X) = X - 3$

[b] 1 The probability that the number on the card is divisible by $3 = \frac{5}{15} = \frac{1}{3}$

2 The probability that the number on the card is an odd number and divisible by $3 = \frac{3}{15} = \frac{1}{5}$

3 Beni Suef

1 1 a 2 d 3 c

4 a 5 b 6 d

2

[a] $\because n(X) = \frac{X(X+2)}{(X+2)(X-2)} + \frac{X+3}{(X-2)(X+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2 , 2 , -3\}$

$, n(X) = \frac{X}{X-2} + \frac{1}{X-2} = \frac{X+1}{X-2}$

[b] $\because 2X + y = 1$ $\therefore y = 1 - 2X$ (1)

$, X + 2y = 5$ (2)

Substituting from (1) in (2) :

$\therefore X + 2(1 - 2X) = 5$ $\therefore X + 2 - 4X = 5$

$\therefore -3X + 2 = 5$ $\therefore -3X = 3$

$\therefore X = -1$

Substituting in (1) : $\therefore y = 3$

$\therefore$ The S.S. $= \{(-1 , 3)\}$

3

[a] $\because$ The domain of $f = \mathbb{R} - \{5\}$

$\therefore$ At $X = 5$ $\therefore X^2 - aX + 25 = 0$

$\therefore (5)^2 - 5a + 25 = 0$ $\therefore 25 - 5a + 25 = 0$

$\therefore 50 - 5a = 0$ $\therefore -5a = -50$

$\therefore a = 10$

[b] $\because 3X^2 = 5X - 1$ $\therefore 3X^2 - 5X + 1 = 0$

$\therefore a = 3 , b = -5 , c = 1$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore X \simeq 1.43$ or $X \simeq 0.23$

$\therefore$ The S.S. $= \{1.43 , 0.23\}$

4

[a] $\because n(X) = \frac{2(X-2)}{(X-2)(X^2+2X+4)} \div \frac{(X+2)}{X^2+2X+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -2\}$

$, n(X) = \frac{2}{X^2+2X+4} \times \frac{X^2+2X+4}{X+2} = \frac{2}{X+2}$

$, n(0) = \frac{2}{0+2} = 1$

[b] $\because X - y = 0$ $\therefore X = y$ (1)

$, X^2 + Xy + y^2 = 27$ (2)

Substituting from (1) in (2) :

$\therefore X^2 + X^2 + X^2 = 27$ $\therefore 3X^2 = 27$

$\therefore X^2 = 9$ $\therefore X = 3$ or $X = -3$

Substituting in (1) : $\therefore y = 3$ or $y = -3$

$\therefore$ The S.S. $= \{(3 , 3) (-3 , -3)\}$

5

[a] $\because n_1(x) = \frac{x+5}{(x-1)(x+5)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{1 , -5\}$

, $n_1(x) = \frac{1}{x-1}$

, $\because n_2(x) = \frac{2x-1}{(2x-1)(x-1)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{1 , \frac{1}{2}\}$

, $n_2(x) = \frac{1}{x-1}$

$\therefore n_1(x) = n_2(x)$ for all the values of $x \in \mathbb{R} - \{1 , -5 , \frac{1}{2}\}$

[b] 1 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0.4 + 0.5 - 0.8 = 0.1$

2 The probability of non-occurrence of the event A $= P(\acute{A}) = 1 - P(A) = 1 - 0.4 = 0.6$

4 El-Menia

1 1 d 2 a 3 a 4 d 5 d 6 c

2

[a] $\because 2y = 3 + x$ $\quad \therefore x = 2y - 3$ (1)

, $2x = 4 - y$ (2)

Substituting from (1) in (2) :

$\therefore 2(2y-3) = 4 - y$ $\quad \therefore 4y - 6 = 4 - y$

$\therefore 5y = 10$ $\quad \therefore y = 2$

Substituting in (1) : $\therefore x = 1$

$\therefore$ The S.S. $= \{(1 , 2)\}$

[b] $\because$ The domain of $n = \mathbb{R} - \{1 , 3\}$

$\therefore$ At $x = 1$ $\quad \therefore x^2 + bx + 3 = 0$

$\therefore (1)^2 + b + 3 = 0$ $\quad \therefore b + 4 = 0$

$\therefore b = -4$

3

[a] $\because x + y = 0$ $\quad \therefore y = -x$ (1)

, $x^2 + y^2 = 2$ (2)

Substituting from (1) in (2) :

$\therefore x^2 + (-x)^2 = 2$ $\quad \therefore x^2 + x^2 = 2$

$\therefore 2x^2 = 2$ $\quad \therefore x^2 = 1$

$\therefore x = 1$ or $x = -1$

Substituting in (1) : $\therefore y = -1$ or $y = 1$

$\therefore$ The S.S. $= \{(1 , -1) , (-1 , 1)\}$

[b] $\because n_1(x) = \frac{x-2}{(x-2)^2}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2\}$

, $n_1(x) = \frac{1}{x-2}$

, $\because n_2(x) = \frac{1}{x-2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{2\}$

$\therefore n_1(x) = n_2(x)$

for all the values of $x \in \mathbb{R} - \{2\}$

4

[a] $\because x^2 + 1 = 3x$ $\quad \therefore x^2 - 3x + 1 = 0$

$\therefore a = 1$, $b = -3$, $c = 1$

$\therefore x = \frac{3 \pm \sqrt{(-3)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{3 \pm \sqrt{5}}{2}$

$\therefore x \simeq 2.62$ or $x \simeq 0.38$

$\therefore$ The S.S. $= \{2.62 , 0.38\}$

[b] $\because n(x) = \frac{x+2}{(x+2)(x-2)} + \frac{2x}{2(x-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -2\}$

, $n(x) = \frac{1}{x-2} + \frac{x}{x-2} = \frac{x+1}{x-2}$

5

[a] 1 $\because$ A , B are two mutually exclusive events

$\therefore P(A \cap B) = 0$

2 $\because P(A \cup B) = P(A) + P(B)$

$\therefore P(A) = P(A \cup B) - P(B) = 0.8 - 0.3 = 0.5$

[b] $\because n(x) = \frac{x(x+2)}{(x+2)(x^2-2x+4)} \div \frac{2x}{x^2-2x+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2 , 0\}$

, $n(x) = \frac{x}{x^2-2x+4} \times \frac{x^2-2x+4}{2x} = \frac{1}{2}$

5 Assiut

1 1 c 2 b 3 b 4 b 5 a 6 b

2

[a] $\because x(x+8) + 9 = 0$ $\quad \therefore x^2 + 8x + 9 = 0$

$\therefore a = 1$, $b = 8$, $c = 9$

$\therefore x = \frac{-8 \pm \sqrt{(8)^2 - 4 \times 1 \times 9}}{2 \times 1} = \frac{-8 \pm 2\sqrt{7}}{2} = -4 \pm \sqrt{7}$

$\therefore x \simeq -1.4$ or $x \simeq -6.6$

$\therefore$ The S.S. $= \{-1.4 , -6.6\}$

[b] $\because n(X) = \frac{(X+3)(X+1)}{(X-3)(X^2+3X+9)} \div \frac{X+3}{X^2+3X+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , -3\}$

$, n(X) = \frac{(X+3)(X+1)}{(X-3)(X^2+3X+9)} \times \frac{X^2+3X+9}{X+3} = \frac{X+1}{X-3}$

3

[a] $\because X - y = 1 \qquad \therefore X = 1 + y \qquad (1)$

$, X^2 + y^2 = 25 \qquad (2)$

Substituting from (1) in (2) :

$\therefore (1+y)^2 + y^2 = 25 \qquad \therefore 1 + 2y + y^2 + y^2 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0 \qquad \therefore y^2 + y - 12 = 0$

$\therefore (y-3)(y+4) = 0 \qquad \therefore y = 3$ or $y = -4$

Substituting in (1) :

$\therefore X = 4$ or $X = -3$

$\therefore$ The S.S. $= \{(4 , 3) , (-3 , -4)\}$

[b] $\because n(X) = \frac{X(X-1)}{(X-1)(X+1)} + \frac{X+5}{(X+1)(X+5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{1 , -1 , -5\}$

$, n(X) = \frac{X}{X+1} + \frac{1}{X+1} = \frac{X+1}{X+1} = 1$

4

[a] $\because 2X - y = 3$ (multiplying by 2)

$\therefore 4X - 2y = 6 \qquad (1)$

$, X + 2y = 4 \qquad (2)$

Adding (1) and (2) : $\therefore 5X = 10 \qquad \therefore X = 2$

Substituting in (1) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2 , 1)\}$

[b] 1 $\because n(X) = \frac{X(X-2)}{(X-1)(X-2)}$

$\therefore n^{-1}(X) = \frac{(X-1)(X-2)}{X(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 2 , 1\}$

$, n^{-1}(X) = \frac{X-1}{X}$

2 $n^{-1}(2)$ is undefined because $2 \notin$ the domain of n^{-1}

5

[a] $\because n_1(X) = \frac{X-4}{(X-2)(X-3)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2 , 3\}$

$, \because n_2(X) = \frac{2X}{X(X-3)(X+3)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{0 , 3 , -3\}$

$\therefore$ The common domain $= \mathbb{R} - \{0 , 2 , 3 , -3\}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{2} + \frac{1}{3} - \frac{1}{8} = \frac{17}{24}$

2 $\because A , B$ are mutually exclusive events

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B) = \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

6 Qena

1

1 a	2 c	3 d
4 b	5 b	6 c

2

[a] $\because X - y = 2 \qquad \therefore X = 2 + y \qquad (1)$

$, X^2 + y^2 = 20 \qquad (2)$

Substituting from (1) in (2) :

$\therefore (2+y)^2 + y^2 = 20 \qquad \therefore 4 + 4y + y^2 + y^2 - 20 = 0$

$\therefore 2y^2 + 4y - 16 = 0 \qquad \therefore y^2 + 2y - 8 = 0$

$\therefore (y+4)(y-2) = 0$

$\therefore y = -4$ or $y = 2$

Substituting in (1) : $\therefore X = -2$ or $X = 4$

$\therefore$ The S.S. $= \{(-2 , -4) , (4 , 2)\}$

[b] $\because n(X) = \frac{X+1}{(X-2)(X+1)} \times \frac{(X-2)(X+5)}{(3X+1)(X+5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -1 , -\frac{1}{3} , -5\}$

$, n(X) = \frac{1}{3X+1}$

$, n(-1)$ is undefined because $-1 \notin$ the domain of n

3

[a] $\because X^2 - 4X + 1 = 0$

$\therefore a = 1 \quad , \quad b = -4 \quad , \quad c = 1$

$\therefore X = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{4 \pm 2\sqrt{3}}{2} = 2 \pm \sqrt{3}$

$\therefore X \simeq 3.73$ or $X \simeq 0.27$

$\therefore$ The S.S. $= \{3.73 , 0.27\}$

[b] $\because n(X) = \frac{X^2+2X+4}{(X-2)(X^2+2X+4)} + \frac{(X-3)(X+3)}{(X-2)(X+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -3\}$

$, n(X) = \frac{1}{X-2} + \frac{X-3}{X-2} = \frac{X-2}{X-2} = 1$

4

[a] Let the measures of the two angles be X , y

$\therefore X - y = 50° \qquad (1)$

$\therefore X + y = 90°$ (2)

Adding (1) and (2) : $\therefore 2X = 140°$

$\therefore X = 70°$

Substituting in (1) : $\therefore y = 20°$

$\therefore$ The measures of the two angles are 70° and 20°

[b] $\because n_1(X) = \dfrac{X^2}{X^2(X-1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \\ , n_1(X) = \dfrac{1}{X-1}\end{array}\right\}(1)$

$, \because n_2(X) = \dfrac{X(X^2+X+1)}{X(X-1)(X^2+X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\} \\ , n_2(X) = \dfrac{1}{X-1}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

5

[a] 1 $\because$ The domain of $n = \mathbb{R} - \{1, -1\}$

$\therefore$ At $X = 1$ $\qquad \therefore X^2 - k = 0$

$\therefore (1)^2 - k = 0 \qquad \therefore k = 1$

2 $\because n(X) = \dfrac{(X-2)(X+1)}{X^2-1} = \dfrac{(X-2)(X+1)}{(X+1)(X-1)}$

$\therefore n^{-1}(X) = \dfrac{(X+1)(X-1)}{(X-2)(X+1)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2, 1, -1\}$

$, n^{-1}(X) = \dfrac{X-1}{X-2}$

[b] 1 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.3 + 0.6 - 0.7 = 0.2$

2 $P(A - B) = P(A) - P(A \cap B) = 0.3 - 0.2 = 0.1$

3 $P(\grave{A}) = 1 - P(A) = 1 - 0.3 = 0.7$

7 Luxor

1

1 c	2 b	3 d
4 a	5 c	6 b

2

[a] $\because 2X - y = 3 \qquad \therefore y = 2X - 3$ (1)

$, X + 2y = 4$ (2)

Substituting from (1) in (2) :

$\therefore X + 2(2X - 3) = 4 \qquad \therefore X + 4X - 6 = 4$

$\therefore 5X = 10 \qquad \therefore X = 2$

Substituting in (1) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2, 1)\}$

[b] $\because n(X) = \dfrac{X(X+2)}{(X-3)(X^2+3X+9)} \div \dfrac{X+2}{X^2+3X+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -2\}$

$, n(X) = \dfrac{X(X+2)}{(X-3)(X^2+3X+9)} \times \dfrac{X^2+3X+9}{X+2} = \dfrac{X}{X-3}$

$, n(2) = \dfrac{2}{2-3} = -2$

$, n(-2)$ is undefined because $-2 \notin$ the domain of n

3

[a] $\because X^2 - 2X = 6 \qquad \therefore X^2 - 2X - 6 = 0$

$\therefore a = 1 \quad , \quad b = -2 \quad , \quad c = -6$

$\therefore X = \dfrac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -6}}{2 \times 1} = \dfrac{2 \pm 2\sqrt{7}}{2} = 1 \pm \sqrt{7}$

$= 1 \pm 2.65$

$\therefore X = 3.65$ or $X = -1.65$

$\therefore$ The S.S. $= \{3.65, -1.65\}$

[b] 1 $n(X) = \dfrac{(X-2)(X+2)}{(X-2)(X-3)} = \dfrac{X+2}{X-3}$

2 The domain of $n = \mathbb{R} - \{2, 3\}$

3 $z(n) = \{-2\}$

4

[a] $\because y - X = 2$

$\therefore y = 2 + X$ (1)

$, X^2 + Xy - 4 = 0$ (2)

Substituting from (1) in (2) :

$\therefore X^2 + X(2 + X) - 4 = 0$

$\therefore X^2 + 2X + X^2 - 4 = 0$

$\therefore 2X^2 + 2X - 4 = 0$

$\therefore X^2 + X - 2 = 0$

$\therefore (X-1)(X+2) = 0$

$\therefore X = 1$ or $X = -2$

Substituting in (1) : $\therefore y = 3$ or $y = 0$

$\therefore$ The S.S. $= \{(1, 3), (-2, 0)\}$

[b] $\because n(X) = \dfrac{X^2+2X+4}{(X-2)(X^2+2X+4)} + \dfrac{(X-3)(X+3)}{(X-2)(X+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -3\}$

$, n(X) = \dfrac{1}{X-2} + \dfrac{X-3}{X-2} = \dfrac{X-2}{X-2} = 1$

5

[a] Let the measures of the two angles be X , y

$\therefore X - y = 50°$ (1)

, $X + y = 90°$ (2)

Adding (1) and (2) : $\therefore 2X = 140°$

$\therefore X = 70°$

Substituting in (1) : $\therefore y = 20°$

$\therefore$ The measures of the two angles are 70° and 20°

[b] 1 $\because$ A , B are mutually exclusive events

$\therefore P(A \cap B) = 0 \quad \therefore P(A \cup B) = P(A) + P(B)$

$\therefore 0.8 = 0.5 + X \quad \therefore X = 0.8 - 0.5 = 0.3$

2 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore 0.8 = 0.5 + X - 0.1$

$\therefore 0.8 = 0.4 + X \quad \therefore X = 0.8 - 0.4 = 0.4$

8 New Valley

1 1 b 2 c 3 b

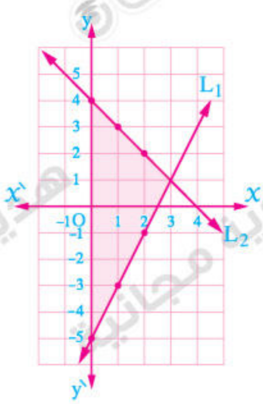
4 d 5 d 6 c

2

[a] $y = 2X - 5$, $y = 4 - X$

X	0	1	2
y	– 5	– 3	– 1

X	0	1	2
y	4	3	2



From the graph : $\therefore$ The S.S. = $\{(3 , 1)\}$

The area of the triangle = $\frac{1}{2} \times 9 \times 3 = 13.5$ square units

[b] $\because n(X) = \frac{X+3}{X^2+2X+4} \times \frac{(X-2)(X^2+2X+4)}{(X-2)(X+3)}$

$\therefore$ The domain of n = $\mathbb{R} - \{2 , -3\}$

, $n(X) = 1$

3

[a] 1 $\because n(X) = \frac{X(X-3)}{(X-3)(X-1)}$

$\therefore n^{-1}(X) = \frac{(X-3)(X-1)}{X(X-3)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 3 , 1\}$

, $n^{-1}(X) = \frac{X-1}{X}$

2 $\because n^{-1}(X) = 2$

$\therefore \frac{X-1}{X} = 2 \quad \therefore 2X = X - 1 \quad \therefore X = -1$

[b] $\because y - X = 2 \quad \therefore X = y - 2$ (1)

, $Xy + y^2 = 4$ (2)

Substituting from (1) in (2) : $\therefore y(y-2) + y^2 = 4$

$\therefore y^2 - 2y + y^2 - 4 = 0 \quad \therefore 2y^2 - 2y - 4 = 0$

$\therefore y^2 - y - 2 = 0 \quad \therefore (y-2)(y+1) = 0$

$\therefore y = 2$ or $y = -1$

Substituting in (1) : $\therefore X = 0$ or $X = -3$

$\therefore$ The S.S. = $\{(0 , 2) , (-3 , -1)\}$

4

[a] $\because 2X^2 = 1 + 5X \quad \therefore 2X^2 - 5X - 1 = 0$

$\therefore a = 2 \quad , b = -5 \quad , c = -1$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times -1}}{2 \times 2} = \frac{5 \pm \sqrt{33}}{4}$

$\therefore X \simeq 2.7$ or $X \simeq -0.2$

$\therefore$ The S.S. = $\{2.7 , -0.2\}$

[b] $\because n(X) = \frac{X(X-1)}{(X-1)(X+1)} + \frac{X+5}{(X+5)(X+1)}$

$\therefore$ The domain of n = $\mathbb{R} - \{1 , -1 , -5\}$

, $n(X) = \frac{X}{X+1} + \frac{1}{X+1} = \frac{X+1}{X+1} = 1$

5

[a] $\because n_1(X) = \frac{X^2}{X^2(X-1)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{0 , 1\}$

, $n_1(X) = \frac{1}{X-1}$ (1)

, $\because n_2(X) = \frac{X(X^2+X+1)}{X(X-1)(X^2+X+1)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{0 , 1\}$

, $n_2(X) = \frac{1}{X-1}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

[b] 1 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= \frac{1}{2} + \frac{1}{3} - \frac{17}{24} = \frac{1}{8}$

2 $P(A - B) = P(A) - P(A \cap B) = \frac{1}{2} - \frac{1}{8} = \frac{3}{8}$

9 South Sinai

1 1 d   2 a   3 b
4 b   5 a   6 c

2

[a] $\because n(X) = \frac{X-3}{(X-3)(X-4)} - \frac{4}{X(X-4)}$

$\therefore$ The domain of $n = \mathbb{R} - \{0, 3, 4\}$

$, n(X) = \frac{1}{X-4} - \frac{4}{X(X-4)} = \frac{X-4}{X(X-4)} = \frac{1}{X}$

[b] $\because 2X^2 - 5X + 1 = 0$

$\therefore a = 2 \quad , \quad b = -5 \quad , \quad c = 1$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{5 \pm \sqrt{17}}{4}$

$\therefore X \simeq 2.28$ or $X \simeq 0.22$

$\therefore$ The S.S. $= \{2.28, 0.22\}$

3

[a] $\because n_1(X) = \frac{2X}{2(X+2)}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \\ , n_1(X) = \frac{X}{X+2} \end{array}\right\}(1)$

$, \because n_2(X) = \frac{X(X+2)}{(X+2)^2}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\} \\ , n_2(X) = \frac{X}{X+2} \end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because X - y = 0 \qquad \therefore X = y \qquad (1)$

$, X^2 + Xy + y^2 = 27 \qquad (2)$

Substituting from (1) in (2) :

$\therefore X^2 + X^2 + X^2 = 27 \qquad \therefore 3X^2 = 27$

$\therefore X^2 = 9$

$\therefore X = 3$ or $X = -3$

Substituting in (1) : $\therefore y = 3$ or $y = -3$

$\therefore$ The S.S. $= \{(3, 3), (-3, -3)\}$

4

[a] $\because 2X - y = 3 \qquad \therefore y = 2X - 3 \qquad (1)$

$, X + 2y = 4 \qquad (2)$

Substituting from (1) in (2) :

$\therefore X + 2(2X - 3) = 4 \qquad \therefore X + 4X - 6 = 4$

$\therefore 5X = 10 \qquad \therefore X = 2$

Substituting in (1) : $\therefore y = 1$

[b] $\because n(X) = \frac{(X-2)(X^2+2X+4)}{(X-2)(X+3)} \times \frac{X+3}{X^2+2X+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -3\}$

$, n(X) = 1$

5

[a] 1 $\because n(X) = \frac{X(X-2)}{(X-2)(X-1)}$

$\therefore n^{-1}(X) = \frac{(X-2)(X-1)}{X(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 2, 1\}$

$, n^{-1}(X) = \frac{X-1}{X}$

2 $\because n^{-1}(X) = 3 \qquad \therefore \frac{X-1}{X} = 3$

$\therefore 3X = X - 1 \qquad \therefore 2X = -1$

$\therefore X = -\frac{1}{2}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.6 - 0.2 = 0.7$

2 $P(\acute{B}) = 1 - P(B) = 1 - 0.6 = 0.4$

10 Red Sea

1 1 c   2 d   3 b
4 c   5 a   6 b

2

[a] $\because X + y = 4 \qquad (1)$

$, 2X - y = 2 \qquad (2)$

Adding (1) and (2) : $\therefore 3X = 6 \qquad \therefore X = 2$

Substituting in (1) : $\therefore y = 2$

$\therefore$ The S.S. $= \{(2, 2)\}$

[b] $\because n_1(X) = \frac{(X+2)(X+1)}{(X-2)(X+2)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2, -2\}$

$, n_1(X) = \frac{X+1}{X-2}$

$, \because n_2(X) = \frac{(X-1)(X+1)}{(X-1)(X-2)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{1, 2\}$

$, n_2(X) = \frac{X+1}{X-2}$

$\therefore n_1(X) = n_2(X)$ for all the values of $X \in \mathbb{R} - \{1, 2, -2\}$

3

[a] $\because n(X) = \frac{(X-2)(X^2+2X+4)}{(X-2)(X-1)} \times \frac{X+1}{X^2+2X+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, 1\}$

$, n(X) = \frac{X+1}{X-1}$

[b] $\because x^2 - 2x - 6 = 0$

$\therefore a = 1 \quad , \quad b = -2 \quad , \quad c = -6$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -6}}{2 \times 1} = \frac{2 \pm 2\sqrt{7}}{2} = 1 \pm \sqrt{7}$

$\therefore x \simeq 3.6 \quad \text{or} \quad x \simeq -1.6$

$\therefore$ The S.S. $= \{3.6 , -1.6\}$

4

[a] $\because x - y = 1 \qquad \therefore x = 1 + y \qquad (1)$

$, x^2 - y^2 = 25 \qquad (2)$

Substituting from (1) in (2) :

$\therefore (1 + y)^2 - y^2 = 25$

$\therefore 1 + 2y + y^2 - y^2 = 25$

$\therefore 2y = 24 \qquad \therefore y = 12$

Substituting in (1) : $\therefore x = 13$

[b] $\because n(x) = \frac{x(x+1)}{(x-1)(x+1)} - \frac{x+5}{(x-1)(x+5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{1 , -1 , -5\}$

$, n(x) = \frac{x}{x-1} - \frac{1}{x-1} = \frac{x-1}{x-1} = 1$

5

[a] $\because n(x) = \frac{2(x-2)}{(x-2)(x+2)}$

$\therefore n^{-1}(x) = \frac{(x-2)(x+2)}{2(x-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2 , -2\}$

$, n^{-1}(x) = \frac{x+2}{2}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.6 + 0.5 - 0.3 = 0.8$

2 $P(A - B) = P(A) - P(A \cap B) = 0.6 - 0.3 = 0.3$

3 $P(\grave{A}) = 1 - P(A) = 1 - 0.6 = 0.4$

امتحانات رقم (3)

الترم الثانى

1 Cairo Governorate

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1. The number of solutions of the first degree equation in two variables is .... solution(s)
   (a) zero (b) 1 (c) 3 (d) infinite
2. If a , b are two integers , then $\frac{a}{b}$ is a rational number if ....
   (a) a > zero (b) b ≠ zero (c) a ≠ zero (d) b = zero
3. If A , B are two mutually exclusive events from the sample space of a random experiment , then $P(A \cap B) =$ ....
   (a) zero (b) – 1 (c) 1 (d) $\frac{1}{2}$
4. The value of the expression : $2a - 3$ when $a = 3$ is ....
   (a) 6 (b) 3 (c) 2 (d) zero
5. The algebraic fraction $\frac{1}{x}$ equals the algebraic fraction .... where $x \neq 0$
   (a) $\frac{x}{x^2}$ (b) $\frac{1}{x^2}$ (c) $\frac{x}{2}$ (d) $\frac{x+1}{x}$
6. If $\sqrt{45} = k\sqrt{5}$, then k = ...
   (a) 9 (b) 5 (c) 4 (d) 3

---

2 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$2x - y = 2 , x + 2y = 11$

[b] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{x^2 - 25}{2x + 10} \div \frac{x^2 - 4x - 5}{x + 1}$$

---

3 [a] By using the general formula , find the solution set of the equation :

$x^2 - 2x - 6 = 0$ in $\mathbb{R}$ "to the nearest one decimal place"

[b] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{2}{x + 3} + \frac{3x}{x^2 + 3x}$$

4 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x y = 9$, $y = x$

[b] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{x^2 - 4}{x^2 - 5x + 6} - \frac{5}{x - 3}$$

---

5 **[a]** If A , B are two events from the sample space of a random experiment

and $P(A) = \frac{3}{8}$, $P(B) = \frac{1}{4}$, $P(A \cap B) = \frac{1}{8}$

, find : $P(A \cup B)$

[b] If $\{-2 , 2\}$ is the set of zeroes of $f : f(x) = x^2 + a$

, find the value of a (showing the steps of solution).

2 Giza Governorate

Answer the following questions :

1 **Choose the correct answer :**

1 The solution set of the inequality : $2 < x < 3$ in $\mathbb{R}$ is ....

(a) $\varnothing$ (b) $]2 , 3[$ (c) $[2 , 3]$ (d) $\{2 , 3\}$

2 The solution set of the two equations $x + y = 0$ and $y - 5 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(-5 , 5)\}$ (b) $\{(5 , -5)\}$ (c) $\{(5 , 5)\}$ (d) $\{(-5 , -5)\}$

3 If x is a negative number , then the greatest number from the following is ....

(a) $7 + x$ (b) $7x$ (c) $\frac{7}{x}$ (d) $7 - x$

4 If $f(x) = \frac{x^2 - 9}{x}$, then the domain of f^{-1} is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{0 , 3\}$ (c) $\mathbb{R} - \{0 , -3 , 3\}$ (d) $\mathbb{R}$

5 If $A \subset B$, then $P(A \cap B) =$ ....

(a) $\varnothing$ (b) zero (c) P (A) (d) P (B)

6 If $x^2 - y^2 = 2(x + y)$, $x + y \neq 0$, then $x - y =$ ....

(a) 2 (b) 4 (c) 6 (d) 8

---

2 **[a] Prove that $n_1 = n_2$ if :** $n_1(x) = \frac{x^3 - 1}{x^3 + x^2 + x}$, $n_2(x) = \frac{(x - 1)(x^2 + 1)}{x^3 + x}$

[b] If A , B are two mutually exclusive events from a random experiment , $P(A) = \frac{1}{3}$

, $P(A \cup B) = \frac{7}{12}$ **, find :** P (B)

3 **[a]** If $n(x) = \frac{x+1}{x^2 - x - 2} \times \frac{x^2 + 3x - 10}{3x^2 + 16x + 5}$, find $n(x)$ in the simplest form , showing the domain and find $n(0)$, $n(-1)$ if it is possible.

[b] Find the S.S. of the following two equations in $\mathbb{R} \times \mathbb{R}$:

$x + y = 7$, $xy = 12$

---

4 **[a]** If the domain of the function $n : n(x) = \frac{b}{x} + \frac{9}{x + a}$ is $\mathbb{R} - \{0 , 4\}$, $n(5) = 2$, find the values of a and b

[b] Find in $\mathbb{R} \times \mathbb{R}$ the S.S. of the two equations : $3x + 2y = 4$, $x - 3y = 5$ algebraically.

---

5 **[a]** Find in $\mathbb{R}$ the S.S. of the equation $x(x - 1) = 4$ approximating the result to the nearest three decimal digits , using the general formula.

[b] Find $n(x)$ in the simplest form , showing the domain if $n(x) = \frac{5}{x - 3} + \frac{4}{3 - x}$

3 Alexandria Governorate

Answer the following questions : (Calculator is permitted)

1 **Choose the correct answer from those given :**

1. The two straight lines : $x + 3y = 4$, $3y + x = 1$ are ....

   (a) parallel. (b) intersecting and not perpendicular.

   (c) coincident. (d) perpendicular.

2. The set of zeroes of the function f where $f(x) = x(x^2 - 2x + 1)$ is ....

   (a) $\{0 , 1\}$ (b) $\{0 , -1\}$ (c) $\{0\}$ (d) $\{1\}$

3. A regular dice is rolled once , then the probability of getting an odd number and an even number together equals ....

   (a) zero (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 1

4. $x^2 - y^2 =$ ....

   (a) $(x - y)^2$ (b) $(x - y)(x + y)$

   (c) $(2x + y)(x + 2y)$ (d) $(x + y)^2$

5. $\left(\sqrt{3} + \sqrt{2}\right)\left(\sqrt{3} - \sqrt{2}\right) =$ ....

   (a) -1 (b) zero (c) 1 (d) $2\sqrt{2} + 2\sqrt{3}$

6 $\mathbb{R}_+ \cup \mathbb{R}_- =$ ....

(a) $\mathbb{R}$ (b) $\mathbb{R}^*$ (c) $\varnothing$ (d) $[0, \infty[$

---

2 **[a]** Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the equations :

$x - y = 4$, $3x + 2y = 7$

[b] If A and B are two events from the sample space of a random experiment , and $P(A) = 0.5$, $P(B) = 0.4$, $P(A \cup B) = 0.8$

, **find :** 1 $P(A \cap B)$ 2 $P(\grave{A})$

---

3 **[a]** Solve the following equation in $\mathbb{R}$ using the general rule , rounding the result to one decimal : $x^2 - x = 4$

[b] If $n_1(x) = \frac{2x}{2x + 8}$, $n_2(x) = \frac{x^2 + 4x}{x^2 + 8x + 16}$, **prove that :** $n_1 = n_2$

---

4 **[a]** If $n(x) = \frac{x}{x - 3} - \frac{3x + 9}{x^2 - 9}$, find $n(x)$ in the simplest form , showing the domain.

[b] A bag contains 20 identical cards numbered from 1 to 20 , a card is randomly drawn. Find the probability that the number on the drawn card is :

1 divisible by 3 2 divisible by 3 or 5

---

5 **[a]** If $n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$, find $n(x)$ in the simplest form , showing the domain.

[b] Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x = 2y$, $x^2 + y^2 = 5$

4 El-Kalyoubia Governorate

Answer the following questions :

1 **Choose the correct answer :**

1 The point of intersection of the two straight lines : $x + 3 = 0$ and $y = 5$ is ....

(a) $(3, 5)$ (b) $(-3, 5)$ (c) $(-3, -5)$ (d) $(3, -5)$

2 The additive inverse of the algebraic fraction $\frac{2}{x - 1}$ is .... , where $x \neq 1$

(a) $\frac{-2}{x + 1}$ (b) $\frac{x - 1}{2}$ (c) $\frac{2}{1 - x}$ (d) $\frac{-2}{-x + 1}$

3 If A and B are two events from the sample space of a random experiment where $A \subset B$, then $P(A - B) =$ ....

(a) $P(A)$ (b) $P(B)$ (c) $\varnothing$ (d) zero

4 If $3^{x-2} = 1$, then $x =$ ....

(a) zero (b) 1 (c) 2 (d) 3

5 If $n(x) = \frac{3x}{x-2}$, then the domain of n^{-1} is ....

(a) $\{0 , 2\}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{0 , 2\}$ (d) $\mathbb{R} - \{0\}$

6 If $\frac{a}{2} = \frac{b}{3}$, then : $3a - 2b + 6 =$ ....

(a) 0 (b) 5 (c) 6 (d) 12

2 [a] Find the solution set of the following equation in $\mathbb{R}$: $x^2 + 3x - 3 = 0$ by using the general formula approximating the result to the nearest one decimal place.

[b] Find $n(x)$ in the simplest form and show the domain if :

$$n(x) = \frac{x^2 + 2x}{x^3 - 27} \div \frac{x + 2}{x^2 + 3x + 9}$$

3 [a] If $n_1(x) = \frac{x}{x^2 - 2x}$ and $n_2(x) = \frac{x + 1}{x^2 - x - 2}$, does $n_1(x) = n_2(x)$?

And show the reason.

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $3x + y = 7$ and $x - y = 1$

4 [a] Find $n(x)$ in the simplest form and show the domain : $n(x) = \frac{x^2 + x}{x^2 - 1} + \frac{5 - x}{x^2 - 6x + 5}$

[b] If the set of zeroes of the function $f : f(x) = \frac{x^2 - ax + 16}{x + b}$

is $\{4\}$ and its domain is $\mathbb{R} - \{2\}$, find the value of each of a and b

5 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 4$ and $x^2 + y^2 = 10$

[b] If $P(\acute{A}) = P(A)$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{5}$

, find : 1 $P(A \cup B)$ 2 $P(B - A)$

5 El-Sharkia Governorate

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from the given ones :

1 $\sqrt{25 - 9} = 5 -$ ....

(a) 3 (b) 4 (c) 1 (d) -1

2 The domain of the multiplicative inverse of the function $f : f(x) = \frac{x - 1}{x^2 + 4}$ is ....

(a) $\mathbb{R} - \{1 , 2 , -2\}$ (b) $\mathbb{R} - \{2 , -2\}$ (c) $\mathbb{R}$ (d) $\mathbb{R} - \{1\}$

3 If the two straight lines : $x - 3y = 2$, $x + ky = 5$ are parallel , then k = ...

(a) 2 (b) -3 (c) 5 (d) 3

4 If $\frac{x}{y} = 3$, $y^2 = 4$, then $x =$ ....

(a) ± 6 (b) -6 (c) 6 (d) 3

5 If $A \subset B$, then $P(A - B) =$ ....

(a) P (B) (b) zero (c) P (A) (d) 1

6 If $2^{x} = 3$, then $8^{-x} =$ ....

(a) -27 (b) 81 (c) $\frac{1}{27}$ (d) $\frac{1}{81}$

---

2 [a] If $n_1(x) = \frac{5x}{5x + 10}$, $n_2(x) = \frac{x^2 + 2x}{x^2 + 4x + 4}$, **prove that :** $n_1 = n_2$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 1$, $y^2 + x = 7$

---

3 [a] Find n (x) in the simplest form , showing the domain where :

$$n(x) = \frac{x^2 - 3x + 2}{x^2 - 4} - \frac{3x - x^2}{x^2 - x - 6}$$

[b] Find the solution set of the following equation in $\mathbb{R}$:

$2x^2 - 4x + 1 = 0$, approximating the result to the nearest two decimal places.

---

4 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 3$, $2x + y = 6$

[b] Find n (x) in the simplest form , showing the domain where : $n(x) = \frac{x^3 - 8}{x^2 - 9} \times \frac{x + 3}{x^2 + 2x + 4}$

---

5 [a] If $f : f(x) = \frac{x^2 + k}{x^2 - mx + 6}$ its domain is $\mathbb{R} - \{2 , 3\}$, $f(4) = 9$, **find :** m k

[b] If A , B are two events of the sample space of a random experiment where

$P(\grave{A}) = 0.4$, $P(B) = 0.5$, $P(A \cup B) = 0.8$

, find each of : 1 P (A) 2 $P(A \cap B)$

6 El-Monofia Governorate

Answer the following questions : *(Calculator is allowed)*

1 Choose the correct answer from those given :

1 If $\sqrt{16 + 9} = x + 2$, then $x =$ ....

(a) 3 (b) 4 (c) 5 (d) 6

2 If the expression : $x^2 + 4x + k$ is a perfect square , then $k =$ ....

(a) -4 (b) 4 (c) 8 (d) 16

3 If $2^x = 3$, then $8^x =$ ....

(a) 6 (b) 9 (c) 12 (d) 27

4 The set of zeroes of f where $f(x) = -3x$ is ....

(a) $\{0\}$ (b) $\{3\}$ (c) $\varnothing$ (d) $\mathbb{R}$

5 If there are an infinite number of solutions of the two equations :

$x + 4y = 7$, $3x + ky = 21$, then $k =$ ....

(a) 4 (b) 7 (c) 12 (d) 21

6 If A is an event of the sample space (S) of a random experiment and $P(A) = P(\grave{A})$, then $P(A) =$ ....

(a) 1 (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

---

2 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 4$, $3x + 2y = 7$

[b] Find $n(x)$ in the simplest form , showing the domain of $n(x)$:

$$n(x) = \frac{x^2 - 2x}{x^2 - 4} + \frac{2x + 6}{x^2 + 5x + 6}$$

---

3 [a] Find in $\mathbb{R}$ by using the general formula the solution set of the equation :

$3x^2 - 5x + 1 = 0$ (rounding the result to two decimal places)

[b] Find $n(x)$ in the simplest form , showing the domain of n :

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \div \frac{x^2 + 2x + 4}{x + 3}$$

---

4 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 1$, $x^2 + y^2 = 25$

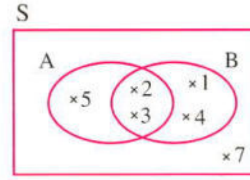
[b] If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, **prove that :** $n_1 = n_2$

---

5 [a] If the opposite figure represents the two events A and B in the sample space (S) of a random experiment

, **find :** 1 $P(A \cap B)$ 2 $P(A \cup B)$ 3 $P(A - B)$

S



[b] If $n(x) = \frac{x^2 + 7x + 10}{3x + 15}$

1 **Find :** $n^{-1}(x)$ in the simplest form and identify the domain of n^{-1}

2 If $n^{-1}(x) = 3$, what is the value of x ?

7 El-Gharbia Governorate

Answer the following questions :

1 Choose the correct answer :

1 The solution set of the inequality $x \leq 1$ in $\mathbb{N}$ is ....

(a) $]0 , 1[$ (b) $[0 , 1]$ (c) $\{1\}$ (d) $\{0 , 1\}$

2 If $B \subset A$, then $P(A \cup B) =$ ....

(a) zero (b) $P(A)$ (c) $P(B)$ (d) $P(A \cap B)$

3 If $x y = 3$, $x y^2 = 12$, then $y =$ ....

(a) 4 (b) ± 4 (c) ± 2 (d) 9

4 The number of solutions of the equation : $y - 2 =$ zero in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1 (c) 2 (d) infinite

5 The set of zeroes of $f : f(x) = \frac{x-3}{x+2}$ is ....

(a) $\{3\}$ (b) $\{-2\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\varnothing$

6 If $x = 5^{-2}$, then the multiplicative inverse of the number x equals ....

(a) 2^{-5} (b) 2^5 (c) $\frac{1}{25}$ (d) 5^2

---

2 **[a]** Find in $\mathbb{R}$ the solution set of the equation : $x^2 - 5 = 4x$ by using the general formula.

[b] Find $n(x)$ in the simplest form, showing the domain of n : $n(x) = \frac{4}{x+2} + \frac{2x}{x+2}$

---

3 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y =$ zero , $x y = 9$

[b] Find $n(x)$ in the simplest form, showing the domain of n where :

$$n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$$

---

4 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $3x - y = -4$, $y = 2x + 3$

[b] If $n(x) = \frac{x^3 - 25x}{x^2 - 25}$, then find in the simplest form the additive inverse of the fraction , showing the domain of n

---

5 **[a]** If A and B are two events from the sample space of a random experiment and

$P(A) = 0.3$, $P(B) = 0.6$, $P(A \cap B) = 0.2$

, find : 1 $P(\grave{B})$ 2 $P(A \cup B)$

[b] If $n_1(x) = \frac{1}{x-2}$, $n_2(x) = \frac{x^2 + 2x + 4}{x^3 - 8}$ **, prove that :** $n_1 = n_2$

8 El-Dakahlia Governorate

Answer the following questions : (Calculator is permitted)

1 **[a] Choose the correct answer :**

1. If $a^2 - b^2 = 18$, $a + b = 6$, then $a - b =$ ....

   (a) 3 (b) 24 (c) 72 (d) 108

2. In an experiment of throwing a fair die once, the probability of appearing a prime number is ....

   (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$

3. If there are an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$ of the two equations : $X + 4y = 7$, $3X + ky = 21$, then $k =$ ....

   (a) 4 (b) 7 (c) 12 (d) 21

[b] By using the general formula , find in $\mathbb{R}$ the solution set of the equation :
$X^2 - 5X + 2 = 0$ (Knowing that : $\sqrt{17} \simeq 4.12$)

2 **[a] Choose the correct answer :**

1. If $n(X) = \frac{X-5}{X-4}$, then the domain of n^{-1} is ....

   (a) $\mathbb{R}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{4\}$ (d) $\mathbb{R} - \{4, 5\}$

2. If $X^2 + y^2 = 5Xy$, then $\frac{X}{y} + \frac{y}{X} =$ ....

   (a) 5 (b) -5 (c) $\sqrt{5}$ (d) $-\sqrt{5}$

3. If $a^2 b = 9$, $a b^2 = 3$, then $a b =$ ....

   (a) 27 (b) 12 (c) 6 (d) 3

[b] If $n_1(X) = \frac{2X}{2X+8}$, $n_2(X) = \frac{X^2+4X}{X^2+8X+16}$, **prove that :** $n_1 = n_2$

3 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $X^2 + Xy = 3$, $X + y = 1$

[b] Find $n(X)$ in its simplest form , showing the domain where :

$$n(X) = \frac{X^2+2X}{X^3-27} \div \frac{X+2}{X^2+3X+9}$$

4 **[a]** Find $n(X)$ in its simplest form , showing the domain where :

$$n(X) = \frac{X^2+X}{X^2-1} - \frac{X-5}{X^2-6X+5}$$

[b] Find the value of each of a , b , given that $(3, -1)$ is a solution for the two equations :
$aX + by = 5$, $3aX + by = 17$

5 **[a]** If A and B are two events from the sample space of a random experiment and $P(A) = 0.4$, $P(B) = 0.5$, $P(A \cap B) = 0.2$

, find : **1** $P(A \cup B)$ **2** $P(A - B)$ **3** $P(S - B)$

[b] If $n(X) = \frac{X^2 + cX + 12}{X^2 + 3X + a}$, the domain of $n = \mathbb{R} - \{3 , b\}$, $n(4) = 6$

, find the values of : a , b , c

9 Suez Governorate

Answer the following questions : ***(Calculators are permitted)***

1 **Choose the correct answer from the given ones :**

1 The domain of the function $f : f(X) = \frac{1}{X - 1}$ is ....

(a) $\mathbb{R} - \{1\}$ (b) $\{0\}$ (c) $\mathbb{R} - \{0\}$ (d) $\mathbb{R} - \{0 , 1\}$

2 If $\frac{X}{6} = \frac{1}{3}$, then $X =$ ....

(a) 3 (b) 2 (c) 1 (d) $\frac{1}{2}$

3 The probability of the impossible event equals ....

(a) $\varnothing$ (b) 0 (c) -1 (d) 1

4 If $(X + 7)^2 = X^2 + kX + 49$, then k = ...

(a) 7 (b) 9 (c) 14 (d) 1

5 The two straight lines : $X + y = 5$, $2X + 2y = 7$ are ....

(a) intersecting and not perpendicular. (b) parallel.

(c) perpendicular. (d) coincident.

6 If $X = y + 1$, $(X - y) + y = 3$, then y = ...

(a) 0 (b) 1 (c) 2 (d) 3

---

2 **[a]** Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$2X + y = 9$, $3X - y = 6$

[b] Find n (X) in the simplest form , showing the domain of n where :

$n(X) = \frac{3}{X^2 + 4} + \frac{X^2 + 1}{X^2 + 4}$

---

3 **[a]** By using the general formula , find in $\mathbb{R}$ the solution set of the equation :

$X^2 - 4X + 2 = 0$ (Approximating the result to the nearest two decimal places)

[b] Find n (X) in the simplest form , showing the domain of n where :

$$n(X) = \frac{X^2 - 3X}{X^2 - 9} \times \frac{X + 3}{2X}$$

---

4 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $X = 2$, $X^2 + y^2 = 20$

[b] If $n_1(X) = \frac{X + 1}{X - 2}$, $n_2(X) = \frac{X^2 - 1}{X^2 - 3X + 2}$

, find the common domain in which $n_1(X) = n_2(X)$

---

5 **[a]** If A and B are two events from the sample space of a random experiment and

$P(A) = 0.4$, $P(B) = 0.5$, $P(A \cap B) = 0.2$

, find : 1 $P(A \cup B)$ 2 $P(\grave{A})$

[b] If $n(X) = \frac{X^2 + 7X + 10}{X + 5}$, find $n^{-1}(X)$ in the simplest form and find the domain of n^{-1}

10 Damietta Governorate

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

1 $\mathbb{Z}_+ \cup \mathbb{Z}_- = \dots\dots$

(a) $\mathbb{Z}_-$ (b) $\mathbb{Z} - \{0\}$ (c) $\varnothing$ (d) $\mathbb{Z}_+$

2 If $\{2\}$ is the set of zeroes of the function $f : f(X) = X^3 - m$, then m = ……

(a) 8 (b) 6 (c) 4 (d) 2

3 If $3^{X+1} = 27$, then $X = \dots\dots$

(a) 4 (b) 3 (c) 1 (d) 2

4 If A and B are two events from the sample space of a random experiment

, $B \subset A$, $B \neq A$, then $P(A \cap B) = \dots\dots$

(a) zero (b) P (A) (c) P (B) (d) $P(A \cup B)$

5 The number of solutions of the two equations : $X + y = 2$, $2y + 2X = 5$ in $\mathbb{R} \times \mathbb{R}$ is ……

(a) zero (b) infinite (c) 1 (d) 2

6 $\sqrt{16 + 9} = 4 + \dots\dots$

(a) 5 (b) 3 (c) 2 (d) 1

---

2 **[a]** By using the general formula , find the solution set of the following equation in $\mathbb{R}$:

$X^2 - 2X - 6 = 0$ (approximating the result to the nearest two decimal places).

[b] Find n (x) in its simplest form , showing the domain of n where :

$$n(x) = \frac{x^2 + 2x}{x^2 - 4} - \frac{2x - 6}{x^2 - 5x + 6}$$

3 **[a]** Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two simultaneous equations :

$x + y = 2 \quad , \quad 3x - y = 6$

[b] Find n (x) in its simplest form , showing the domain of n where :

$$n(x) = \frac{x^2 + 2x}{x^3 - 27} \div \frac{x + 2}{x^2 + 3x + 9}$$

4 **[a]** Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations :

$x - y = 0 \quad , \quad 2x^2 - y^2 = 9$

[b] If $n_1(x) = \frac{2x}{2x + 8} \quad , \quad n_2(x) = \frac{x^2 + 4x}{x^2 + 8x + 16}$

, prove that : $n_1 = n_2$

5 **[a]** If $n(x) = \frac{x^2 - 2x}{x - 2}$

1. Find $n^{-1}(x)$ in the simplest form , showing the domain of n^{-1}
2. If $n^{-1}(x) = 4$, what is the value of x ?

[b] If A and B are two events of the sample space of a random experiment , P (A) = 0.3 , P (B) = 0.6

, find P (A $\cup$ B) in each of the following cases :

1. A and B are mutually exclusive events.
2. $P(A \cap B) = 0.2$

11 Kafr El-Sheikh Governorate

Answer the following questions : ***(Calculators are permitted)***

1 **Choose the correct answer from those given :**

1. The probability of the impossible event is ....

   (a) $\varnothing$ (b) zero (c) 0.5 (d) 1

2. The set of zeroes of the function $f : f(x) = x^2 + 9$ in $\mathbb{R}$ is ....

   (a) $\{3\}$ (b) $\{-3\}$ (c) $\{3 , -3\}$ (d) $\varnothing$

3. If the sum of ages of a man and his son is 35 years , then the sum of their ages after ten years is .... years.

   (a) 25 (b) 35 (c) 55 (d) 45

4 If $x^2 - y^2 = 12$, $x + y = 4$, then $x - y =$ ....

(a) 48 (b) 3 (c) 8 (d) 16

5 The two straight lines : $x - 3 = 0$, $y = 4$ are intersecting in the .... quadrant.

(a) first (b) second (c) third (d) fourth

6 The two equations : $2x + 3y = 6$, $4x + ky = 12$ have an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$ if $k =$ ....

(a) 3 (b) 6 (c) 2 (d) zero

---

2 [a] Find graphically the solution set of the two equations :

$x + 2y = 4$, $x - y = 1$ in $\mathbb{R} \times \mathbb{R}$

[b] If A , B are two events of the sample space of a random experiment and $P(A) = 0.3$, $P(B) = P(\grave{B})$, $P(A \cap B) = 0.2$

, **find :** 1 $P(A \cup B)$ 2 $P(A - B)$

---

3 [a] Find in $\mathbb{R}$ the solution set of the equation : $x^2 + 2x - 4 = 0$

by using the general rule , rounding the result to two decimals.

[b] Find the solution set of the two equations : $x + y = 3$, $x^2 + y^2 = 5$

together in $\mathbb{R} \times \mathbb{R}$

---

4 [a] If $n_1(x) = \frac{2x}{2x+8}$, $n_2(x) = \frac{x^2+4x}{x^2+8x+16}$, **prove that :** $n_1 = n_2$

[b] Find $n(x)$ in the simplest form , showing the domain of n : $n(x) = \frac{x^2-3x+9}{x^3+27} - \frac{4-x^2}{x^2+x-6}$

---

5 [a] If $n(x) = \frac{x^2-2x}{x^2-2x+2}$, then find $n^{-1}(x)$ in the simplest form , find the domain of n^{-1}

[b] If the domain of n where $n(x) = \frac{a}{x} + \frac{4}{x+b}$ is $\mathbb{R} - \{0 , 3\}$, $n(-1) = 5$

, find the value of each of a and b

12 El-Fayoum Governorate

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

1 The number of solutions of the two equations : $x + y = 2$, $y + x = 3$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) 0 (b) 1 (c) 2 (d) 3

2 $\sqrt{64 + 36} = 8 +$ ....

(a) 6 (b) 10 (c) 2 (d) 3

3 The set of zeroes of the function $f : f(x) = x^2 + 25$ in $\mathbb{R}$ is ....

(a) $\{5\}$ (b) $\{5, -5\}$ (c) $\mathbb{R}$ (d) $\varnothing$

4 If $3x = 45$, then $\frac{1}{5}x =$ ....

(a) 9 (b) 3 (c) 10 (d) 5

5 If $x + y = 5$, $x - y = 3$, then $x^2 - y^2 =$ ....

(a) 15 (b) 8 (c) 16 (d) 25

6 If A, B are two mutually exclusive events of the sample space of a random experiment, then $P(A \cap B) =$ ....

(a) $\varnothing$ (b) 0 (c) P (A) (d) P (B)

---

2 **[a]** Find in $\mathbb{R}$ the solution set of the equation : $3x^2 - 5x + 1 = 0$ using the general formula, approximating the result to the nearest two decimal digits.

[b] Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x^2 + 2x}{x^3 - 8} \times \frac{x^2 + 2x + 4}{x + 2}$$

---

3 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x - y = 4$, $3x + 2y = 7$

[b] If $n_1(x) = \frac{2x}{2x + 4}$, $n_2(x) = \frac{x^2 + 2x}{x^2 + 4x + 4}$, **prove that :** $n_1 = n_2$

---

4 **[a]** Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$x - y = 1$, $x^2 + y^2 = 25$

[b] If $n(x) = \frac{x^2 - 2x}{x^2 - 3x + 2}$, **find :**

1 $n^{-1}(x)$ in the simplest form, showing the domain of n^{-1}

2 The value of $n^{-1}(2)$, if it is possible.

---

5 **[a]** Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x - 3}{x^2 - 5x + 6}$$

[b] If A, B are two events of the sample space of a random experiment, $P(A) = 0.8$, $P(B) = 0.7$, $P(A \cap B) = 0.6$

, find : 1 $P(A \cup B)$ 2 The probability of non occurrence of A

13 Souhag Governorate

Answer the following questions : ***(Calculators are allowed)***

1 Choose the correct answer from those given :

1 If A and B are two events of the sample space of a random experiment , $A \subset B$, then $P(A \cup B) =$ ....

(a) A (b) P (A) (c) B (d) P (B)

2 The number of solutions of the two equations : $x + 2y = 3$, $2x + 4y + 6 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) a unique solution. (b) two solutions.

(c) an infinite number of solutions. (d) zero.

3 The set of zeroes of f where $f(x) = \frac{x^2 - 3x + 2}{x - 2}$ is ....

(a) $\{2\}$ (b) $\{1\}$ (c) $\mathbb{R} - \{2\}$ (d) $\{1, 2\}$

4 If $x^2 + 11x + 24 = (x + a)(x + b)$, then $a + b =$ ....

(a) 25 (b) 24 (c) 10 (d) 11

5 If $5^{n-1} = \frac{1}{25}$, then $|n| =$ ....

(a) 1 (b) -1 (c) -3 (d) 3

6 If $\frac{x + 5}{x - 3}$ is a rational number , then $x \neq$ ....

(a) -5 (b) 5 (c) 3 (d) -3

---

2 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $2x + y = 19$, $y = x + 1$

[b] Find n (y) in the simplest form , showing the domain of n where :

$$n(y) = \frac{y^2 - 9}{3y^2 + 9y} \div \frac{y^3 + y}{y^2 + 1}$$

---

3 [a] If $f(x) = \frac{x + 5}{x^2 - a} - \frac{1}{x}$ where the domain of $f = \mathbb{R} - \{0, -5, 5\}$, find a , then find $f(x)$ in the simplest form and find $f(-1)$

[b] Find in $\mathbb{R}$ the solution set of the equation : $2x^2 + 3x + 1 = 0$

---

4 [a] If A and B are two events from the sample space of a random experiment and $P(A) = 0.7$, $P(B) = 0.6$, $P(A \cap B) = 0.5$, **find :** 1 $P(A \cup B)$ 2 P (S)

[b] Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :
$x + y = 5$, $2x^2 + xy = 14$

5 **[a]** Find n (X) in the simplest form , showing the domain of n

where $n(X) = \frac{X^2 - 5X + 6}{X^2 - 4X + 4} \div (X^2 - 3X)$ and find n (3)

[b] If $n_1(X) = \frac{X^2 + 5X + 25}{X^3 - 125}$, $n_2(X) = \frac{X - 5}{X^2 - 25}$, is $n_1 = n_2$? and why ?

14 Aswan Governorate

Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer from those given :**

1 If z (f) = $\{2\}$, $f(X) = X^3 - m$, then m = ...

(a) $\sqrt[3]{2}$ (b) 2 (c) 4 (d) 8

2 The solution set of the two equations $X + 3y = 4$, $3y + X = 1$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\varnothing$ (b) $\{(1 , 1)\}$ (c) $\{(0 , \frac{1}{3})\}$ (d) $\{(0 , 0)\}$

3 If $A \subset S$, $P(A) = P(\grave{A})$, then P (A) = ...

(a) 1 (b) $\frac{1}{4}$ (c) zero (d) $\frac{1}{2}$

4 If $X^2 - y^2 = 10$, $X - y = 2$, then $X + y$ = ...

(a) 10 (b) 2 (c) 5 (d) 12

5 If (5 , b – 7) lies on the X-axis , then b = ...

(a) 4 (b) 5 (c) 7 (d) zero

6 If $\sqrt[3]{-27} = -\sqrt{X}$, then X = ...

(a) 9 (b) – 9 (c) 3 (d) – 3

---

2 **[a]** Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$y = X + 4$, $X + y = 4$

[b] If $n_1(X) = \frac{X^2}{X^3 - X^2}$, $n_2(X) = \frac{X^3 + X^2 + X}{X^4 - X}$

, prove that : $n_1 = n_2$

---

3 **[a]** Find n (X) in the simplest form , showing the domain of n where :

$n(X) = \frac{X^2 + 2X}{X^2 - 4} + \frac{X - 3}{X^2 - 5X + 6}$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$X - y = 0$, $X^2 + Xy + y^2 = 27$

4 [a] By using the general rule , find in $\mathbb{R}$ the solution set of the equation :

$2x^2 - 5x + 1 = 0$ approximating the result to the nearest one decimal digit.

[b] If A , B are two events of the sample space of a random experiment and

$P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, **find $P(A \cup B)$ in each of the following two cases :**

1 If $P(A \cap B) = \frac{1}{8}$ 2 If A and B are two mutually exclusive events.

---

5 [a] If $n(x) = \frac{x^2 - 2x}{(x-2)(x^2+2)}$, find $n^{-1}(x)$, showing the domain on n^{-1}

[b] Find $n(x)$ in the simplest form , showing the domain of n where :

$$n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$$

15 North Sinai Governorate

Answer the following questions : (Calculators are allowed)

1 **Choose the correct answer from those given :**

1 The solution set of the two equations : $x - 2 = 0$, $y = 1$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{2, 1\}$ (b) $\{(2, 1)\}$ (c) $\mathbb{R}$ (d) $\varnothing$

2 The probability of the certain event equals ....

(a) $\frac{1}{2}$ (b) zero (c) 1 (d) $\varnothing$

3 $(-1)^9 + (-1)^{10} =$ ....

(a) -2 (b) 2 (c) zero (d) 1

4 The domain of the function f where $f(x) = \frac{8}{x-4}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{4\}$ (c) $\mathbb{R} - \{0\}$ (d) $\mathbb{R} - \{0, 4\}$

5 If $3x = 1$, then $15x =$ ....

(a) $\frac{1}{3}$ (b) 15 (c) 3 (d) 5

6 If x is a negative number , then the greatest number of the following may be ....

(a) $4 - x$ (b) $\frac{4}{x}$ (c) $4x$ (d) $4 + x$

---

2 [a] Find the solution set of the equation $x^2 - 5x + 2 = 0$ in $\mathbb{R}$ by using the general formula , rounding the result to two decimals.

[b] Find in the simplest form , showing the domain :

$$n(x) = \frac{x^2 - x - 6}{x^2 - 4} \times \frac{x^2 - 2x}{x - 3}$$

3 [a] Find the solution set of the following two equations algebraically in $\mathbb{R} \times \mathbb{R}$:

$X - y = 1$, $2X + y = 8$

[b] Find in the simplest form , showing the domain :

$$n(X) = \frac{X^2 + 2X + 4}{X^3 - 8} + \frac{X^2 - 2X - 3}{X^2 - 5X + 6}$$

---

4 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations algebraically :

$X - y = 2$, $X^2 + y^2 = 34$

[b] If $n_1(X) = \frac{3X}{3X + 9}$, $n_2(X) = \frac{X^2 + 3X}{X^2 + 6X + 9}$, **prove that :** $n_1 = n_2$

---

5 [a] If $n(X) = \frac{X^2 - 5X}{X^2 - 6X + 5}$

, find $n^{-1}(X)$ in the simplest form , showing the domain of n^{-1}

[b] If A , B are two events in the sample space of a random experiment ,

$P(A) = 0.4$, $P(B) = 0.7$, $P(A \cup B) = 0.8$

, **find :** [1] $P(A \cap B)$ [2] $P(A - B)$

Exam 1 Port Said Governorate

First Multiple choice questions

Choose the correct answer from those given :

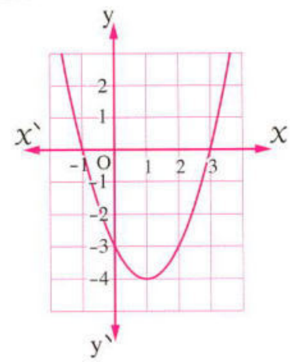
1 The solution set of the two equations : $x = 3$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(3, 4)\}$ (b) $\{(4, 3)\}$ (c) $(3, 4)$ (d) $\varnothing$

2 If $3^{x} = 1$, then $x =$ ....

(a) -1 (b) 1 (c) zero (d) 3

3 The opposite figure represents the graph of a quadratic function f , then the S.S. of the equation $f(x) = 0$ in $\mathbb{R}$ is ....



(a) $\{-3, -1\}$

(b) $\{-1, 3\}$

(c) $\{3, -3\}$

(d) $\{(-1, 3)\}$

4 The set of zeroes of the function $f : f(x) = x - 5$ is ....

(a) $\{\text{zero}\}$ (b) $\{5\}$ (c) $\{-5\}$ (d) $\{5, -5\}$

5 The simplest form of the algebraic fraction $\frac{x^2 - 5x + 6}{x - 3}$ is .... where $x \neq 3$

(a) $x - 3$ (b) $\frac{x-2}{x-3}$ (c) $x - 2$ (d) $\frac{1}{x-2}$

6 $\frac{5x}{x^2+1} \div \frac{x}{x^2+1} =$ .... where $x \neq 0$

(a) -5 (b) -1 (c) 1 (d) 5

7 The common domain of the two fractions $\frac{2x}{x-3}$ and $\frac{x}{x+5}$ is ....

(a) $\{3, -5\}$ (b) $\mathbb{R} - \{0, 3, -5\}$ (c) $\mathbb{R} - \{3, -5\}$ (d) $\mathbb{R}$

8 The probability of the impossible event = ...

(a) 1 (b) $\frac{1}{2}$ (c) -1 (d) zero

9 If $x^2 = 16$, then $x =$ .... where $x \in \mathbb{R}$

(a) 4 (b) -4 (c) ± 4 (d) 8

10 The two lines which represent the two equations : $x + y = 3$, $x + y = 5$ are ....

(a) parallel. (b) intersecting. (c) perpendicular. (d) congruent.

11 One of the solutions for the two equations : $x - y = 1$, $x^2 + y^2 = 5$ is ....

(a) $(-2 , 1)$ (b) $(2 , 1)$ (c) $(1 , 2)$ (d) $\{2 , 1\}$

12 If $\{-2\}$ is the solution set for the equation : $x^2 - a x + 4 = 0$, then a = ...

(a) -2 (b) -4 (c) 2 (d) 4

13 The domain of the function $f : f(x) = \frac{x+2}{x-1}$ is ....

(a) $\mathbb{R} - \{1\}$ (b) $\mathbb{R} - \{-2\}$ (c) $\mathbb{R} - \{1 , -2\}$ (d) $\mathbb{R}$

14 $\frac{x-1}{5} \times \frac{x+1}{x^2-1} =$ .... (where $x \neq \pm 1$)

(a) $\frac{x+1}{5}$ (b) 5 (c) $\frac{1}{5}$ (d) $\frac{5}{x+1}$

15 If a die is rolled once , then the probability of getting an odd number = ...

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) zero

16 $|-5| + |5| =$ ....

(a) -10 (b) 25 (c) zero (d) 10

17 The general law to solve the equation : $a x^2 + b x + c = 0$ is .... where a , b , c are real number , $a \neq 0$

(a) $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (b) $\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$ (c) $\frac{-b \pm \sqrt{b - 4ac}}{2a}$ (d) $\frac{-b \pm \sqrt{b^2 - 4ac}}{a}$

18 If A , B are two mutually exclusive events in a simple space , then $P(A \cap B) =$ ....

(a) $\varnothing$ (b) zero (c) 0.5 (d) 1

19 The simplest form of $f(x) = \frac{x}{x-1} - \frac{1}{x-1}$ is .... (where $x \neq 1$)

(a) $\frac{x}{x-1}$ (b) $x - 1$ (c) $\frac{x-1}{2}$ (d) 1

20 The number of solutions of the equation : $x + y = 5$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero. (b) one. (c) two. (d) an infinite number.

21 If A , B are two events in a sample space and $P(A) = 0.3$, $P(B) = 0.6$ and $P(A \cap B) = 0.2$, then $P(A \cup B) =$ ....

(a) 0.6 (b) 0.7 (c) 0.9 (d) 0.5

Second Essay questions

22 **Find the solution set in $\mathbb{R} \times \mathbb{R}$ for the two equations : $x = 3$, $x y = 6$**

23 **Find n (x) in the simplest form and mention the domain :** $n(x) = \frac{x-3}{x^2-7x+12} + \frac{x-5}{x-4}$

24 If $n(x) = \frac{x^2-5x+6}{x^2-9}$, find $n^{-1}(x)$ in its simplest form showing the domain.

Exam 2

First Multiple choice questions

Choose the correct answer from those given :

1 The number of solutions of the two equations : $2x - 3y = 5$, $2x - 3y = 7$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) zero (b) 1 (c) 2 (d) an infinite number

2 The intersection point of the two straight lines : $x + 2 = 0$, $y = x$ is ....

(a) (2 , 2) (b) (2 , 0) (c) (– 2 , – 2) (d) (0 , 0)

3 The set of zeroes of the function $f : f(x) = x(x^2 - 2x + 1)$ is ....

(a) $\{0 , 1\}$ (b) $\{0 , -1\}$ (c) $\{0\}$ (d) $\{1\}$

4 One of the solutions of the two equations : $x - y = 2$, $x^2 + y^2 = 20$ is ....

(a) (– 4 , 2) (b) (2 , – 4) (c) (3 , 1) (d) (4 , 2)

5 The numbers needed to complete the pattern : $\frac{1}{5}$, 0.4 , $\frac{3}{5}$, ... , ... , ... , $\frac{7}{5}$ respectively are ....

(a) 0.8 , $\frac{6}{5}$, 1.2 (b) 0.8 , 1 , 1.2 (c) 0.6 , 0.8 , 1 (d) 0.8 , 1 , 1.4

6 If $x \in \mathbb{R} - \{0 , 1\}$, then $\frac{1-x}{x} \div \frac{x-1}{x}$ in the simplest form is ....

(a) 1 (b) – 1 (c) $x - 1$ (d) x

7 The solution set of the two equations : $x = 5$, $y - 2 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(5 , -2)\}$ (b) $\{(5 , 2)\}$ (c) $\{(-5 , 2)\}$ (d) $\{(-3 , 5)\}$

8 **In the opposite figure :**

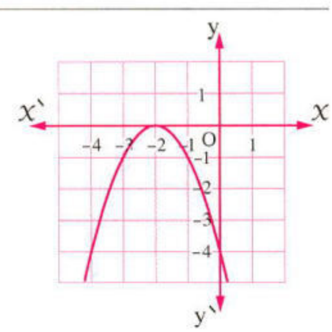
The solution set of the equation : $f(x) = 0$ in $\mathbb{R}$ is ....

(a) $\{-2\}$

(b) $\{-2 , 4\}$

(c) $\{4\}$

(d) $\varnothing$



9 If $\sqrt{100-36} = 10 - a$, then a = ...

(a) 2 (b) 6 (c) 4 (d) 3

---

10 If $X + 3y = 7$, then $X + 3(y + 5) =$ ....

(a) 3 (b) 7 (c) 22 (d) 21

---

11 The simplest form of the rule of the function $f : f(X) = \frac{2X}{X+1} + \frac{X}{X+1}$ is .... (where $X \neq -1$)

(a) $\frac{3X}{X+1}$ (b) 3 (c) 2 (d) $\frac{2}{X+1}$

---

12 If $A \subset B$, then $P(A \cup B) =$ ....

(a) zero (b) P (A) (c) P (B) (d) $P(A \cap B)$

---

13 If $X^2 + Xy = 15$, $X + y = 5$, then $X =$ ....

(a) 3 (b) 4 (c) 5 (d) 6

---

14 If A and B are two events of the sample space S , $A \subset B$, P (A) = 0.2 , P (B) = 0.6 , then P (B – A) = ...

(a) 0.6 (b) 0.2 (c) 0.8 (d) 0.4

---

15 If the domain of the function n : $n(X) = \frac{X-2}{X^2+a}$ is $\mathbb{R}$, then a 0

(a) = (b) > (c) ≤ (d) <

---

16 If a regular die is rolled once , then the probability of getting an odd number and even number together equals ....

(a) zero (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 1

---

17 If the function $f : f(X) = \frac{X^2-9}{X}$ has a multiplicative inverse , then the common domain is ....

(a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{0 , 3\}$ (c) $\mathbb{R} - \{0 , -3 , 3\}$ (d) $\mathbb{R}$

---

18 The domain of the additive inverse of the function $f : f(X) = \frac{X+2}{X-3}$ is ....

(a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{-2\}$ (c) $\mathbb{R} - \{-2 , 3\}$ (d) $\mathbb{R}$

---

19 If A is an event from the sample space of a random experiment , then $P(\acute{A}) =$ ....

(a) 1 (b) – 1 (c) 1 – P (A) (d) P (A) – 1

---

20 The common domain of the two fractions $\frac{2}{X^2-1}$, $\frac{5X}{X^2-X}$ is ....

(a) $\mathbb{R} - \{1\}$ (b) $\mathbb{R} - \{0 , 1\}$ (c) $\mathbb{R} - \{0 , 1 , -1\}$ (d) $\mathbb{R} - \{1 , -1\}$

21 The curve of the function $f : f(X) = X^2 - 5X$ intersects the X-axis at the two points ....

(a) (2 , 0) , (0 , 5) (b) (0 , 0) , (5 , 0) (c) (2 , 0) , (– 5 , 0) (d) (0 , 0) , (– 5 , 0)

Second Essay questions

22 **Find the values of a and b knowing that (3 , – 1) is the solution of the two equations :**

$aX + by - 5 = 0$, $3aX + by = 17$

---

23 If $n_1(X) = \frac{2X}{2X + 8}$, $n_2(X) = \frac{X^2 + 4X}{X^2 + 8X + 16}$ **Prove that :** $n_1 = n_2$

---

24 If the domain of the function $n : n(X) = \frac{X - 1}{X^2 - aX + 9}$ is $\mathbb{R} - \{3\}$, then find the value of a

Exam 3

First Multiple choice questions

Choose the correct answer from those given :

1 The two straight lines : $3X = 7$, $2y = 9$ are ....

(a) parallel. (b) coincident.

(c) intersecting and non perpendicular. (d) perpendicular.

---

2 The rule which describes the pattern : $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, ... in terms of n where $n \in \mathbb{Z}_+$ is ....

(a) $\frac{2}{n+1}$ (b) $n + \frac{1}{2}$ (c) $\frac{n}{n+1}$ (d) $\frac{2n-1}{n+1}$

---

3 The probability of the certain event equals ....

(a) zero (b) $\varnothing$ (c) 1 (d) – 1

---

4 If $f(X) = \frac{X}{X - 2}$, then $f(2)$ ....

(a) = 2 (b) = 1 (c) = zero (d) is undefined.

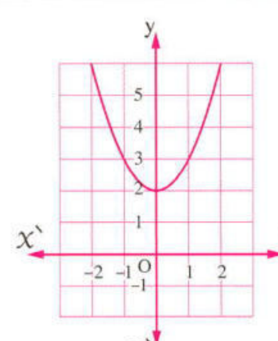
---

5 **In the opposite figure :**

The solution set of the equation : $f(X) = $ zero in $\mathbb{R}$ is ....

(a) $\varnothing$ (b) $\{2\}$

(c) $\{0\}$ (d) $\{(0 , 2)\}$



6 If $k < 0$ which of the following quantities is greater in numerical value ?

(a) $5 - k$ (b) $5 + k$ (c) $5k$ (d) $\frac{5}{k}$

---

7 The simplest form of $\frac{x^2+1}{x^2+4} + \frac{3}{x^2+4}$ is ....

(a) 3 (b) 4 (c) 1 (d) $\frac{1}{x^2+1}$

---

8 The ordered pair which satisfies each of the two equations : $x y = 2$, $x - y = 1$ is ....

(a) $(1 , 1)$ (b) $(2 , 1)$ (c) $(1 , 2)$ (d) $\left(\frac{1}{2} , 1\right)$

---

9 The domain of a multiplicative inverse of the algebraic fraction $\frac{x-2}{x^3-27}$ is ....

(a) $\mathbb{R} - \{2\}$ (b) $\mathbb{R} - \{3 , 2\}$ (c) $\mathbb{R} - \{2 , -3 , 3\}$ (d) $\mathbb{R} - \{3 , -2\}$

---

10 If $ab = 5$, $ab^2 = 20$, then $b^{-1} =$ ....

(a) 100 (b) 25 (c) 4 (d) $\frac{1}{4}$

---

11 If $x \neq 0$, then $\frac{3x}{x^2+5} \div \frac{x}{x^2+5} =$ ....

(a) -3 (b) -1 (c) 1 (d) 3

---

12 The S.S. of the two equations : $x = y$, $y = 2$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{2\}$ (b) $\{(2 , 0)\}$ (c) $\{(0 , 2)\}$ (d) $\{(2 , 2)\}$

---

13 The curve of $y = a x^2 + b x + c$ intersects the y-axis at the point ....

(a) $(0 , b)$ (b) $(b , 0)$ (c) $(c , 0)$ (d) $(0 , c)$

---

14 The set of zeroes of the function $f : f(x) = 0$ is ....

(a) $\varnothing$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R}$ (d) zero

---

15 If a regular coin is tossed once , then the probability of getting head or tail is ....

(a) 100 % (b) 50 % (c) 25 % (d) zero %

---

16 The sum of two numbers is 8 and their product is 12 , then the two numbers are ....

(a) 2 , 6 (b) 7 , 1 (c) 3 , 5 (d) 4 , 4

---

17 If A and B are two mutually exclusive events in a random experiment and $P(\acute{A}) = 0.6$, $P(A \cup B) = 0.9$, then $P(B) =$ ....

(a) 0.5 (b) 0.4 (c) 0.6 (d) 0.3

18 If $X = 3$ is one of the solutions of the equation : $X^2 - aX - 6 = 0$, then a = ...

(a) 3 (b) 2 (c) 1 (d) – 1

---

19 If $A \cap B = \varnothing$, then P (A – B) = ...

(a) P (A) (b) P (B) (c) P (B – A) (d) 1

---

20 The common domain of the two fractions $\frac{2}{X - 3}$, $\frac{7}{2X - 6}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{0 , 3\}$ (c) $\mathbb{R} - \{3\}$ (d) $\mathbb{R} - \{3 , -3\}$

---

21 If $X \neq 0$, then $\frac{X + 1}{X} - \frac{1}{X} =$ ....

(a) 1 (b) $\frac{1}{X}$ (c) $\frac{X + 2}{X}$ (d) – 1

Second Essay questions

22 A rectangle is with a length more than its width by 4 cm. If the perimeter of the rectangle is 28 cm. Find the area of the rectangle.

---

23 If $n(X) = \frac{X^2 - 2X + 1}{X^3 - 1} \div \frac{X - 1}{X^2 + X + 1}$ Find n (X) in the simplest form , showing the domain of n

---

24 If the domain of the function n where $n(X) = \frac{b}{X} + \frac{9}{X + a}$ is $\mathbb{R} - \{0 , 4\}$, n (5) = 2

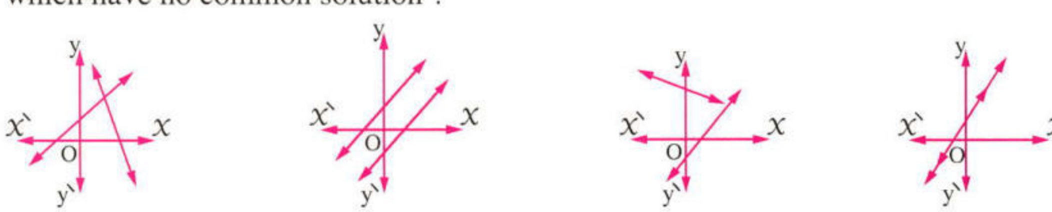
Find the values of a and b

Exam 4

First Multiple choice questions

Choose the correct answer from those given :

1 Which of the following graphs represents two equations of the first degree in two variables which have no common solution ?



(a) (b) (c) (d)

---

2 If $f(X) = \frac{X + 2}{X - 3}$, then the domain of n^{-1} = ...

(a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{-2\}$ (c) $\mathbb{R} - \{-2 , 3\}$ (d) $\mathbb{R}$

3 $\frac{1}{3}$ the number $(27)^3$ is ....

(a) 3^3 (b) 3^4 (c) 3^6 (d) 3^8

4 The S.S. of the two equations : $x + y = 0$, $x^2 + y^2 = 2$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(0 , 0)\}$ (b) $\{(1 , -1)\}$

(c) $\{(-1 , 1)\}$ (d) $\{(1 , -1) , (-1 , 1)\}$

5 The set of zeroes of the function $f : f(x) = x^6 - 32x$ is ....

(a) $\{0 , 2\}$ (b) $\{2 , 16\}$ (c) $\{6 , 16\}$ (d) $\{0 , 5\}$

6 If A and B are two mutually exclusive events , the $P(A \cup B) =$ ....

(a) P (A) (b) P (B) (c) $P(A \cap B)$ (d) P (A) + P (B)

7 If a number is formed from two digits , its units digit = its tens digit = x , then the number is ....

(a) x^2 (b) $2x$ (c) $11x$ (d) $10x^2$

8 The simplest form of the rule of the function f where $f(x) = \frac{3x}{x+1} \div \frac{x}{x+1}$ is .... where $x \notin \{-1 , 0\}$

(a) 3 (b) 1 (c) -1 (d) -3

9 The two straight lines which represent the two equations : $x = -1$, $y - 2 = 0$ are intersecting at the point ....

(a) $(-1 , 2)$ (b) $(2 , -1)$ (c) $(1 , -2)$ (d) $(-1 , -2)$

10 The function f where $f(x) = \frac{x-2}{x-5}$ has an additive inverse if the domain is ....

(a) $\mathbb{R} - \{2\}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\mathbb{R}$

11 If x is the additive identity , y is the multiplicative identity , then $2^x + 3^y =$ ....

(a) 2 (b) 3 (c) 4 (d) 5

12 If S is the sample space of a random experiment , then $P(\tilde{S}) =$ ....

(a) 1 (b) zero (c) $\frac{1}{2}$ (d) -1

13 If $x \in \mathbb{R} - \{2\}$, then $\frac{x}{x-2} + \frac{2}{2-x} =$ ....

(a) 1 (b) 2 (c) x (d) -1

14 A regular die is rolled once , if the event A is «appearing a prime number» and the event B is «appearing an odd number» , then $P(A \cap B) =$ ....

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

15 If the curve of the quadratic function f passes through the points $(-1, 0)$, $(0, -4)$ and $(4, 0)$, then the solution set of the equation $f(X) = 0$ in $\mathbb{R}$ is ....

(a) $\{-1, 0\}$ (b) $\{-4, 0\}$ (c) $\{-1, 4\}$ (d) $\{4, -4\}$

---

16 If $n_1(X) = \frac{X^2 - 4}{X - 2}$, $n_2(X) = X + 2$, then $n_1 = n_2$ when $X \in$ ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\mathbb{R} - \{1\}$

---

17 If $X = 3$, $X^2 - y^2 = 5$, then $y =$ ....

(a) -2 (b) 2 (c) ± 2 (d) 4

---

18 If $P(A) = 4\,P(\grave{A})$, then $P(A) =$ ....

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.2

---

19 **In the opposite figure :**

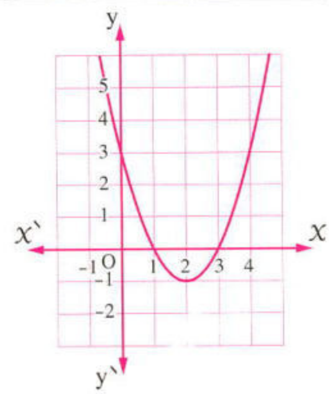
The S.S. of the equation $f(X) = 0$ in $\mathbb{R}$ is ....

(a) $(2, -1)$

(b) $\{(3, 1)\}$

(c) $\{3, 1\}$

(d) $(3, 0)$



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20 If $f(X) = \frac{7 + X}{7 - X}$ where $X \in \mathbb{R} - \{7, -7\}$, then $f(-2) =$ ....

(a) $\frac{-1}{f(-2)}$ (b) $\frac{-1}{f(2)}$ (c) $\frac{1}{f(2)}$ (d) $\frac{1}{f(-2)}$

---

21 The S.S. of the two equations : $X y = 5$, $X + X y = 6$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(1, 5)\}$ (b) $\{(5, 6)\}$ (c) $\{(5, 2)\}$ (d) $\{(1, 5), (5, 1)\}$

Second Essay questions

22 **Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations :**

$X - y = 1$, $X^2 + y^2 = 25$

---

23 If $n_1(X) = \frac{X^2 - 4}{X^2 + X - 6}$, $n_2(X) = \frac{X^3 - X^2 - 6X}{X^3 - 9X}$ **Prove that :** $n_1(X) = n_2(X)$

for all the values of X which belong to the common domain and find this domain

---

24 If $n(X) = \frac{X^2 + 2X + 4}{X^3 - 8} - \frac{9 - X^2}{X^2 + X - 6}$ **Find :** $n(X)$ in its simplest form showing the domain of n

Exam 5

First Multiple choice questions

Choose the correct answer from those given :

1. If $n(X) = \frac{X}{X-1}$, then the domain of n^{-1} is ....

(a) $\mathbb{R} - \{1 , 0\}$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R} - \{1\}$ (d) $\{1 , 0\}$

2. The set of zeroes of the function $f : f(X) = \frac{9 - X^2}{X - 2}$ is ....

(a) $\{2\}$ (b) $\mathbb{R} - \{2\}$ (c) $\{3 , -3\}$ (d) $\{3 , -3 , 2\}$

3. The two straight lines : $X + 2y = 1$, $2X + 4y = 6$ are ....

(a) parallel. (b) intersecting and non perpendicular.

(c) perpendicular. (d) coincident.

4. $(-1)^{37} - (-1)^{36} =$ ....

(a) -2 (b) zero (c) 1 (d) 2

5. The S.S. of the two equations : $X - y = 0$, $X y = 9$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) $\{(0 , 0)\}$ (b) $\{(-3 , 3)\}$

(c) $\{(3 , 3)\}$ (d) $\{(-3 , -3) , (3 , 3)\}$

6. The domain of the function f where $f(X) = \frac{X + 1}{(X - 2)^7}$ is ....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{2 , 7\}$ (d) $\mathbb{R} - \{2 , -1\}$

7. If the point of intersection of the two straight lines : $X - 1 = 0$, $y = 2k$ lies on the fourth quadrant , then k may be equal ....

(a) -5 (b) 0 (c) 1 (d) 5

8. If $\sqrt{64 + 36} = 8 + X$, then $X =$ ....

(a) 9 (b) 6 (c) 2 (d) 100

9. The common domain of the two functions $n_1 : n_1(X) = 3X - 15$, $n_2 : n_2(X) = X^2 + 4$ is ....

(a) $\mathbb{R} - \{5\}$ (b) $\mathbb{R} - \{2 , -2\}$ (c) $\mathbb{R} - \{5 , 2 , -2\}$ (d) $\mathbb{R}$

10. If $y = 1 - X$, $(X + y)^2 + y = 5$, then $y =$ ....

(a) 5 (b) 3 (c) -4 (d) 4

11 If S is the sample space of a random experiment , $A \subset S$, then $P(A) + P(\grave{A}) = 3$ m.

, then m = ...

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{1}{4}$

12 $4^{15} + 4^{15} =$ ....

(a) 4^{30} (b) 4^{zero} (c) 8^{15} (d) 2^{31}

13 If there are an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$X + 4y = 7$, $3X + ky = 21$, then k = ...

(a) 4 (b) 7 (c) 12 (d) 21

14 If $n(X) = \frac{3}{X} + \frac{X}{3}$, then the domain of n is ....

(a) $\mathbb{R} - \{3, 0\}$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R} - \{3\}$ (d) $\mathbb{R}$

15 If the curve of the quadratic function f does not intersect X-axis at any point , so the number of solutions to the equation $f(X) = 0$ in $\mathbb{R}$ is ....

(a) an infinite number of solutions. (b) two solutions.

(c) a unique solution. (d) zero

16 If $n(X) = \frac{X}{X-3} - \frac{1}{X-3}$, then the set of zeroes of the function n is ....

(a) $\{3\}$ (b) $\{1\}$ (c) $\{-1\}$ (d) $\{-3\}$

17 If A and B are two events of the sample space of a random experiment , $P(A) = 0.6$

, $P(A \cap B) = 0.4$, then $P(A - B) =$ ....

(a) 0.6 (b) 0.4 (c) 0.2 (d) 0.1

18 In the equation : $aX^2 + bX + c = 0$, if $b^2 - 4ac < 0$, then the number of roots of the equation in $\mathbb{R}$ is ....

(a) 1 (b) 2 (c) zero (d) an infinite number.

19 If A and B are two events in a sample space , the event of occurrence of A only is ....

(a) $\grave{A}$ (b) $A - B$ (c) $A \cap B$ (d) $A \cup B$

20 The set of zeroes of the function $f : f(X) = -3X$ is ....

(a) $\{0\}$ (b) $\{-3\}$ (c) $\{-3, 0\}$ (d) $\mathbb{R}$

21 If A and B are two events of the sample space of a random experiment

, $A \subset B$, $P(A) = 0.2$, $P(B) = 0.6$, then $P(A \cup B) =$ ....

(a) 0.2 (b) 0.4 (c) 0.6 (d) 0.8

Second Essay questions

22 **Find in $\mathbb{R}$ the S.S. of the following equation using the general formula :**

$x(x - 1) = 5$ approximating the resulte to the nearest one decimal digits.

---

23 If $n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$ Find $n(x)$ in its simplest form showing the domain of n

---

24 If the set of zeroes of the function f where $f(x) = a x^2 + b x + 15$ is $\{3 , 5\}$

Find the values of a and b

Answers of governorates' examinations of algebra & probability

1 Cairo

1

1 d   2 b   3 a   4 b   5 a   6 d

2

[a] $\because 2X - y = 2$ (multiplying by 2)

$\therefore 4X - 2y = 4$ (1)

, $\because X + 2y = 11$ (2)

Adding (1) and (2) : $\therefore 5X = 15$ $\therefore X = 3$

Substituting in (2) : $\therefore y = 4$

$\therefore$ The S.S. $= \{(3 , 4)\}$

[b] $\because n(X) = \frac{(X+5)(X-5)}{2(X+5)} \div \frac{(X-5)(X+1)}{X+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{-5 , -1 , 5\}$

, $n(X) = \frac{X-5}{2} \times \frac{1}{X-5} = \frac{1}{2}$

3

[a] $\because a = 1$, $b = -2$, $c = -6$

$\therefore X = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -6}}{2 \times 1} = \frac{2 \pm 2\sqrt{7}}{2} = 1 \pm \sqrt{7}$

$\therefore X \simeq 3.6$ or $X \simeq -1.6$

$\therefore$ The S.S. $= \{3.6 , -1.6\}$

[b] $\because n(X) = \frac{2}{X+3} + \frac{3X}{X(X+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3 , 0\}$

, $n(X) = \frac{2}{X+3} + \frac{3}{X+3} = \frac{5}{X+3}$

4

[a] $\because y = X$ (1)   , $Xy = 9$ (2)

Substituting from (1) in (2) : $\therefore X^2 = 9$

$\therefore X = 3$ or $X = -3$

Substituting in (1) : $\therefore y = 3$ or $y = -3$

$\therefore$ The S.S. $= \{(3 , 3) , (-3 , -3)\}$

[b] $\because n(X) = \frac{(X+2)(X-2)}{(X-2)(X-3)} - \frac{5}{X-3}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , 3\}$

, $n(X) = \frac{X+2}{X-3} - \frac{5}{X-3} = \frac{X-3}{X-3} = 1$

5

[a] $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{3}{8} + \frac{1}{4} - \frac{1}{8} = \frac{1}{2}$

[b] $\because \{-2 , 2\}$ is the set of zeroes of the function.

$\therefore f(2) = 0$ $\therefore 2^2 + a = 0$ $\therefore a = -4$

2 Giza

1

1 b   2 a   3 d   4 c   5 c   6 a

2

[a] $\because n_1(X) = \frac{(X-1)(X^2+X+1)}{X(X^2+X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0\} \\ , n_1(X) = \frac{X-1}{X}\end{array}\right\}$ (1)

, $\because n_2(X) = \frac{(X-1)(X^2+1)}{X(X^2+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0\} \\ , n_2(X) = \frac{X-1}{X}\end{array}\right\}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because$ A , B are two mutually exclusive events

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B)$

$\therefore P(B) = P(A \cup B) - P(A) = \frac{7}{12} - \frac{1}{3} = \frac{1}{4}$

3

[a] $\because n(X) = \frac{X+1}{(X-2)(X+1)} \times \frac{(X-2)(X+5)}{(3X+1)(X+5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -1 , -5 , -\frac{1}{3}\}$

, $n(X) = \frac{1}{3X+1}$

, $n(0) = \frac{1}{3(0)+1} = 1$

, $n(-1)$ is undefined because $-1 \notin$ the domain of n

[b] $\because X + y = 7$ $\therefore y = 7 - X$ (1)

, $Xy = 12$ (2)

Substituting from (1) in (2) : $\therefore X(7 - X) = 12$

$\therefore 7X - X^2 = 12$ $\therefore X^2 - 7X + 12 = 0$

$\therefore (X-4)(X-3) = 0$ $\therefore X = 4$ or $X = 3$

Substituting in (1) : $\therefore y = 3$ or $y = 4$

$\therefore$ The S.S. $= \{(4 , 3) , (3 , 4)\}$

4

[a] $\because$ The domain of $n = \mathbb{R} - \{0, 4\}$

$\therefore$ At $x = 4$ $\quad\therefore x + a = 0$

$\therefore 4 + a = 0$ $\quad\therefore a = -4$

, $\because n(5) = 2$ $\quad\therefore \frac{b}{5} + \frac{9}{5-4} = 2$

$\therefore \frac{b}{5} + 9 = 2$ $\quad\therefore \frac{b}{5} = -7$ $\quad\therefore b = -35$

[b] $\because 3x + 2y = 4$ (1)

, $x - 3y = 5$ (multiplying by -3)

$\therefore -3x + 9y = -15$ (2)

Adding (1) and (2) : $\therefore 11y = -11$ $\quad\therefore y = -1$

Substituting in (1) : $\therefore x = 2$

$\therefore$ The S.S. $= \{(2, -1)\}$

5

[a] $\because x^2 - x - 4 = 0$

$\therefore a = 1$, $b = -1$, $c = -4$

$\therefore x = \frac{1 \pm \sqrt{(-1)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{1 \pm \sqrt{17}}{2}$

$\therefore x \simeq 2.562$ or $x \simeq -1.562$

$\therefore$ The S.S. $= \{2.562, -1.562\}$

[b] $\because n(x) = \frac{5}{x-3} - \frac{4}{x-3}$

$\therefore$ The domain of $n = \mathbb{R} - \{3\}$

, $n(x) = \frac{5-4}{x-3} = \frac{1}{x-3}$

3 Alexandria

1

1 a 2 a 3 a 4 b 5 c 6 b

2

[a] $\because x - y = 4$ (multiplying by 2)

$\therefore 2x - 2y = 8$ (1) , $3x + 2y = 7$ (2)

Adding (1) and (2) : $\therefore 5x = 15$ $\quad\therefore x = 3$

Substituting in (1) : $\therefore y = -1$

$\therefore$ The S.S. $= \{(3, -1)\}$

[b] 1 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$
$= 0.5 + 0.4 - 0.8 = 0.1$

2 $\because P(A) + P(\acute{A}) = 1$

$\therefore P(\acute{A}) = 1 - P(A) = 1 - 0.5 = 0.5$

3

[a] $\because x^2 - x - 4 = 0$

$\therefore a = 1$, $b = -1$, $c = -4$

$\therefore x = \frac{1 \pm \sqrt{(-1)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{1 \pm \sqrt{17}}{2}$

$\therefore x \simeq 2.6$ or $x \simeq -1.6$

[b] $\because n_1(x) = \frac{2x}{2(x+4)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-4\}$
, $n_1(x) = \frac{x}{x+4}$ (1)

, $\because n_2(x) = \frac{x(x+4)}{(x+4)^2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{-4\}$
, $n_2(x) = \frac{x}{x+4}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

4

[a] $\because n(x) = \frac{x}{x-3} - \frac{3(x+3)}{(x+3)(x-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3, -3\}$

, $n(x) = \frac{x}{x-3} - \frac{3}{x-3} = \frac{x-3}{x-3} = 1$

[b] 1 The probability that the number on the drawn card is divisible by $3 = \frac{6}{20} = \frac{3}{10}$

2 The probability that the number on the drawn card is divisible by 3 or $5 = \frac{9}{20}$

5

[a] $\because n(x) = \frac{(x-1)(x^2+x+1)}{(x-1)^2} \times \frac{2(x-1)}{x^2+x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

, $n(x) = 2$

[b] $\because x = 2y$ (1) , $x^2 + y^2 = 5$ (2)

Substituting from (1) in (2) :

$\therefore (2y)^2 + y^2 = 5$ $\quad\therefore 4y^2 + y^2 = 5$

$\therefore 5y^2 = 5$

$\therefore y^2 = 1$ $\quad\therefore y = 1$ or $y = -1$

Substituting in (1) : $\therefore x = 2$ or $x = -2$

$\therefore$ The S.S. $= \{(2, 1), (-2, -1)\}$

4 El-Kalyoubia

1

1 b 2 c 3 d 4 c 5 c 6 c

2

[a] $\because a = 1$, $b = 3$, $c = -3$

$\therefore X = \frac{-3 \pm \sqrt{(3)^2 - 4 \times 1 \times -3}}{2 \times 1} = \frac{-3 \pm \sqrt{21}}{2}$

$\therefore X \simeq 0.8$ or $X \simeq -3.8$

$\therefore$ The S.S. $= \{0.8 , -3.8\}$

[b] $\because n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \div \frac{X+2}{X^2+3X+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , -2\}$

$, n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \times \frac{X^2+3X+9}{X+2}$

$= \frac{X}{X-3}$

3

[a] $\because n_1(X) = \frac{X}{X(X-2)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0 , 2\} \\ , n_1(X) = \frac{1}{X-2}\end{array}\right\} (1)$

$, \because n_2(X) = \frac{X+1}{(X-2)(X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{2 , -1\} \\ , n_2(X) = \frac{1}{X-2}\end{array}\right\} (2)$

From (1) and (2) : $\therefore n_1(X) = n_2(X)$

for all the values of X which $\in$ the common domain $\mathbb{R} - \{0 , 2 , -1\}$

[b] $\because 3X + y = 7$ (1) $, X - y = 1$ (2)

Adding (1) and (2) : $\therefore 4X = 8$ $\therefore X = 2$

Substituting in (2) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(2 , 1)\}$

4

[a] $\because n(X) = \frac{X(X+1)}{(X-1)(X+1)} - \frac{X-5}{(X-1)(X-5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{1 , -1 , 5\}$

$, n(X) = \frac{X}{X-1} - \frac{1}{X-1} = \frac{X-1}{X-1} = 1$

[b] $\because$ The domain of $f = \mathbb{R} - \{2\}$

$\therefore$ At $X = 2$ $\therefore X + b = 0$ $\therefore 2 + b = 0$

$\therefore b = -2$ $, \because z(f) = 4$ $\therefore$ At $X = 4$

$\therefore X^2 - aX + 16 = 0$ $\therefore (4)^2 - 4a + 16 = 0$

$\therefore 16 - 4a + 16 = 0$ $\therefore 4a = 32$ $\therefore a = 8$

5

[a] $\because X - y = 4$ $\therefore X = y + 4$ (1)

$, X^2 + y^2 = 10$ (2)

Substituting from (1) in (2) : $\therefore (y+4)^2 + y^2 = 10$

$\therefore y^2 + 8y + 16 + y^2 - 10 = 0$

$\therefore 2y^2 + 8y + 6 = 0$ $\therefore y^2 + 4y + 3 = 0$

$\therefore (y+1)(y+3) = 0$

$\therefore y = -1$ or $y = -3$

Substituting in (1) : $\therefore X = 3$ or $X = 1$

$\therefore$ The S.S. $= \{(3 , -1) , (1 , -3)\}$

[b] 1 $\because P(A) = P(\acute{A})$, $P(A) + P(\acute{A}) = 1$

$\therefore P(A) = \frac{1}{2}$

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{2} + \frac{1}{3} - \frac{1}{5} = \frac{19}{30}$

2 $P(B - A) = P(B) - P(A \cap B) = \frac{1}{3} - \frac{1}{5} = \frac{2}{15}$

5 El-Sharkia

1

1 c 2 d 3 b 4 a 5 b 6 c

2

[a] $\because n_1(X) = \frac{5X}{5(X+2)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \\ , n_1(X) = \frac{X}{X+2}\end{array}\right\} (1)$

$, \because n_2(X) = \frac{X(X+2)}{(X+2)^2}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\} \\ , n_2(X) = \frac{X}{X+2}\end{array}\right\} (2)$

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because X - y = 1$ $\therefore X = 1 + y$ (1)

$, y^2 + X = 7$ (2)

Substituting from (1) in (2) :

$\therefore y^2 + (1 + y) = 7$ $\therefore y^2 + y - 6 = 0$

$\therefore (y-2)(y+3) = 0$ $\therefore y = 2$ or $y = -3$

Substituting in (1) : $\therefore X = 3$ or $X = -2$

$\therefore$ The S.S. $= \{(3 , 2) , (-2 , -3)\}$

3

[a] $\because n(X) = \frac{(X-2)(X-1)}{(X-2)(X+2)} + \frac{X(X-3)}{(X+2)(X-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -2, 3\}$

$, n(X) = \frac{X-1}{X+2} + \frac{X}{X+2} = \frac{2X-1}{X+2}$

[b] $\because a = 2 \quad , b = -4 \quad , c = 1$

$\therefore X = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{4 \pm 2\sqrt{2}}{4} = \frac{2 \pm \sqrt{2}}{2}$

$\therefore X \simeq 1.71$ or $X \simeq 0.29$

$\therefore$ The S.S. $= \{1.71, 0.29\}$

4

[a] $\because X - y = 3 \quad (1) \quad , 2X + y = 6 \quad (2)$

Adding (1) and (2) : $\therefore 3X = 9 \quad \therefore X = 3$

Substituting in (1) : $\therefore y = 0$

$\therefore$ The S.S. $= \{(3, 0)\}$

[b] $\because n(X) = \frac{(X-2)(X^2+2X+4)}{(X+3)(X-3)} \times \frac{X+3}{X^2+2X+4}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 3\}$

$, n(X) = \frac{X-2}{X-3}$

5

[a] $\because$ The domain $= \mathbb{R} - \{2, 3\}$

$\therefore$ At $X = 2 \qquad \therefore X^2 - mX + 6 = 0$

$\therefore (2)^2 - 2m + 6 = 0 \qquad \therefore 4 - 2m + 6 = 0$

$\therefore 2m = 10 \qquad \therefore m = 5$

$, \because f(4) = 9 \qquad \therefore \frac{(4)^2 + k}{(4)^2 - 5 \times 4 + 6} = 9$

$\therefore \frac{16+k}{2} = 9 \qquad \therefore 16 + k = 18 \qquad \therefore k = 2$

$\therefore mk = 5 \times 2 = 10$

[b] 1 $\because P(A) + P(\acute{A}) = 1$

$\therefore P(A) = 1 - P(\acute{A}) = 1 - 0.4 = 0.6$

2 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.6 + 0.5 - 0.8 = 0.3$

6 El-Monofia

1

1 a 2 b 3 d 4 a 5 c 6 c

2

[a] $\because X - y = 4$ (multiplying by 2)

$\therefore 2X - 2y = 8 \qquad (1)$

$, 3X + 2y = 7 \qquad (2)$

Adding (1) and (2) : $\therefore 5X = 15 \qquad \therefore X = 3$

Substituting in (1) : $\therefore y = -1$

$\therefore$ The S.S. $= \{(3, -1)\}$

[b] $\because n(X) = \frac{X(X-2)}{(X+2)(X-2)} + \frac{2(X+3)}{(X+2)(X+3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, 2, -3\}$

$, n(X) = \frac{X}{X+2} + \frac{2}{X+2} = \frac{X+2}{X+2} = 1$

3

[a] $\because a = 3 \quad , b = -5 \quad , c = 1$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore X \simeq 1.43$ or $X \simeq 0.23$

$\therefore$ The S.S. $= \{1.43, 0.23\}$

[b] $\because n(X) = \frac{(X-2)(X^2+2X+4)}{(X-2)(X+3)} \div \frac{X^2+2X+4}{X+3}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 2\}$

$, n(X) = \frac{X^2+2X+4}{X+3} \times \frac{X+3}{X^2+2X+4} = 1$

4

[a] $\because X - y = 1 \qquad \therefore X = y + 1 \qquad (1)$

$, X^2 + y^2 = 25 \qquad (2)$

Substituting from (1) in (2) :

$\therefore (y+1)^2 + y^2 = 25 \quad \therefore y^2 + 2y + 1 + y^2 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0 \qquad \therefore y^2 + y - 12 = 0$

$\therefore (y-3)(y+4) = 0 \qquad \therefore y = 3$ or $y = -4$

Substituting in (1) : $\therefore X = 4$ or $X = -3$

$\therefore$ The S.S. $= \{(4, 3), (-3, -4)\}$

[b] $\because n_1(X) = \frac{X^2}{X^2(X-1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \\ , n_1(X) = \frac{1}{X-1}\end{array}\right\} (1)$

$, \because n_2(X) = \frac{X(X^2+X+1)}{X(X-1)(X^2+X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\} \\ , n_2(X) = \frac{1}{X-1}\end{array}\right\} (2)$

From (1) and (2) : $\therefore n_1 = n_2$

5

[a] 1 $P(A \cap B) = \frac{2}{6} = \frac{1}{3}$ 2 $P(A \cup B) = \frac{5}{6}$

3 $P(A - B) = \frac{1}{6}$

[b] 1 $\because n(X) = \frac{(X+2)(X+5)}{3(X+5)}$

$\therefore n^{-1}(X) = \frac{3(X+5)}{(X+2)(X+5)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{-2, -5\}$

, $n^{-1}(X) = \frac{3}{X+2}$

2 $\because n^{-1}(X) = 3$ $\therefore \frac{3}{X+2} = 3$

$\therefore 3X + 6 = 3$ $\therefore 3X = -3$ $\therefore X = -1$

7 El-Gharbia

1

1 d 2 b 3 a 4 d 5 a 6 d

2

[a] $\because X^2 - 4X - 5 = 0$

$\therefore a = 1$, $b = -4$, $c = -5$

$\therefore X = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times -5}}{2 \times 1} = \frac{4 \pm \sqrt{36}}{2} = \frac{4 \pm 6}{2}$

$\therefore X = \frac{4+6}{2} = 5$ or $X = \frac{4-6}{2} = -1$

$\therefore$ The S.S. $= \{5, -1\}$

[b] $\because n(X) = \frac{4}{X+2} + \frac{2X}{X+2}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2\}$

, $n(X) = \frac{4+2X}{X+2} = \frac{2(X+2)}{X+2} = 2$

3

[a] $\because X - y = 0$ $\therefore X = y$ (1)

, $Xy = 9$ (2)

Substituting from (1) in (2) : $\therefore X^2 = 9$

$\therefore X = 3$ or $X = -3$

Substituting in (1) : $\therefore y = 3$ or $y = -3$

$\therefore$ The S.S. $= \{(3, 3), (-3, -3)\}$

[b] $\because n(X) = \frac{(X+3)(X-5)}{(X+3)(X-3)} \div \frac{2(X-5)}{(X-3)^2}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 3, 5\}$

, $n(X) = \frac{X-5}{X-3} \times \frac{(X-3)^2}{2(X-5)} = \frac{X-3}{2}$

4

[a] $\because y = 2X + 3$ (1) , $3X - y = -4$ (2)

Substituting from (1) in (2) :

$\therefore 3X - (2X + 3) = -4$ $\therefore 3X - 2X - 3 = -4$

$\therefore X - 3 = -4$ $\therefore X = -1$

Substituting in (1) : $\therefore y = 1$

$\therefore$ The S.S. $= \{(-1, 1)\}$

[b] $\because n(X) = \frac{X(X-5)(X+5)}{(X-5)(X+5)}$

$\therefore$ The domain of $n = \mathbb{R} - \{5, -5\}$, $n(X) = X$

$\therefore$ The additive inverse is $-X$

5

[a] 1 $\because P(B) + P(\acute{B}) = 1$

$\therefore P(\acute{B}) = 1 - P(B) = 1 - 0.6 = 0.4$

2 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= 0.3 + 0.6 - 0.2 = 0.7$

[b] $\because n_1(X) = \frac{1}{X-2}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2\}$ (1)

, $\because n_2(X) = \frac{X^2 + 2X + 4}{(X-2)(X^2 + 2X + 4)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{2\}$

, $n_2(X) = \frac{1}{X-2}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

8 El-Dakahlia

1 [a] 1 a 2 a 3 c

[b] $\because a = 1$, $b = -5$, $c = 2$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 2}}{2 \times 1} = \frac{5 \pm \sqrt{17}}{2} = \frac{5 \pm 4.12}{2}$

$\therefore X = 4.56$ or $X = 0.44$

$\therefore$ The S.S. $= \{4.56, 0.44\}$

2 [a] 1 d 2 a 3 d

[b] $\because n_1(X) = \frac{2X}{2(X+4)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-4\}$

, $n_1(X) = \frac{X}{X+4}$ (1)

, $\because n_2(X) = \frac{X(X+4)}{(X+4)^2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{-4\}$

, $n_2(X) = \frac{X}{X+4}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

3

[a] $\because X + y = 1$ $\therefore y = 1 - X$ (1)

$, X^2 + X y = 3$ (2)

Substituting from (1) in (2) :

$\therefore X^2 + X(1 - X) = 3$ $\therefore X^2 + X - X^2 = 3$

$\therefore X = 3$

Substituting in (1) : $\therefore y = -2$

$\therefore$ The S.S. $= \{(3 , -2)\}$

[b] $\because n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \div \frac{X+2}{X^2+3X+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , -2\}$

$, n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \times \frac{X^2+3X+9}{X+2}$

$= \frac{X}{X-3}$

4

[a] $\because n(X) = \frac{X(X+1)}{(X+1)(X-1)} - \frac{X-5}{(X-5)(X-1)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-1 , 1 , 5\}$

$, n(X) = \frac{X}{X-1} - \frac{1}{X-1} = \frac{X-1}{X-1} = 1$

[b] $\because (3 , -1)$ is a solution for the two equations

$\therefore 3a - b = 5$ (1) , $9a - b = 17$ (2)

Subtracting (1) from (2) : $\therefore 6a = 12$ $\therefore a = 2$

Substituting in (1) : $\therefore b = 1$

5

[a] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.4 + 0.5 - 0.2 = 0.7$

2 $P(A - B) = P(A) - P(A \cap B) = 0.4 - 0.2 = 0.2$

3 $P(S - B) = P(S) - P(S \cap B) = P(S) - P(B)$

$= 1 - 0.5 = 0.5$

[b] $\because$ The domain of $n = \mathbb{R} - \{3 , b\}$

$\therefore$ At $X = 3$ $\therefore X^2 + 3X + a = 0$

$\therefore (3)^2 + 3 \times 3 + a = 0$ $\therefore 9 + 9 + a = 0$

$\therefore a = -18$

$\therefore n(X) = \frac{X^2 + cX + 12}{X^2 + 3X - 18} = \frac{X^2 + cX + 12}{(X-3)(X+6)}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , -6\}$

$\therefore b = -6$

$, \because n(4) = \frac{(4)^2 + 4c + 12}{(4)^2 + 3 \times 4 - 18} = 6$

$\therefore \frac{16 + 4c + 12}{10} = 6$ $\therefore 4c + 28 = 60$

$\therefore 4c = 32$ $\therefore c = 8$

9 Suez

1

1 a   2 b   3 b   4 c   5 b   6 c

2

[a] $\because 2X + y = 9$ (1) $, 3X - y = 6$ (2)

Adding (1) and (2) : $\therefore 5X = 15$ $\therefore X = 3$

Substituting in (1) : $\therefore y = 3$

$\therefore$ The S.S. $= \{(3 , 3)\}$

[b] $\because n(X) = \frac{3}{X^2+4} + \frac{X^2+1}{X^2+4}$

$\therefore$ The domain of $n = \mathbb{R}$ $, n(X) = \frac{X^2+4}{X^2+4} = 1$

3

[a] $\because a = 1$, $b = -4$, $c = 2$

$\therefore X = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 2}}{2 \times 1} = \frac{4 \pm 2\sqrt{2}}{2} = 2 \pm \sqrt{2}$

$\therefore X \simeq 3.41$ or $X \simeq 0.59$

$\therefore$ The S.S. $= \{3.41 , 0.59\}$

[b] $\because n(X) = \frac{X(X-3)}{(X-3)(X+3)} \times \frac{X+3}{2X}$

$\therefore$ The domain of $n = \mathbb{R} - \{0 , 3 , -3\}$

$, n(X) = \frac{1}{2}$

4

[a] $\because X = 2$ (1) $, X^2 + y^2 = 20$ (2)

Substituting from (1) in (2) : $\therefore (2)^2 + y^2 = 20$

$\therefore 4 + y^2 = 20$ $\therefore y^2 = 16$

$\therefore y = 4$ or $y = -4$

$\therefore$ The S.S. $= \{(2 , 4) , (2 , -4)\}$

[b] $\because n_1(X) = \frac{X+1}{X-2}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2\}$

$, \because n_2(X) = \frac{(X-1)(X+1)}{(X-2)(X-1)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{1 , 2\}$

$, n_2(X) = \frac{X+1}{X-2}$

$\therefore n_1(X) = n_2(X)$ for all the values of $X \in \mathbb{R} - \{1 , 2\}$

5

[a] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.4 + 0.5 - 0.2 = 0.7$

[2] $\because P(A) + P(\acute{A}) = 1$

$\therefore P(\acute{A}) = 1 - P(A) = 1 - 0.4 = 0.6$

[b] $\because n(X) = \frac{(X+2)(X+5)}{X+5}$

$\therefore n^{-1}(X) = \frac{X+5}{(X+2)(X+5)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{-2 , -5\}$

, $n^{-1}(X) = \frac{1}{X+2}$

10 Damietta

1

[1] b [2] a [3] d [4] c [5] a [6] d

2

[a] $\because a = 1$, $b = -2$, $c = -6$

$\therefore X = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -6}}{2 \times 1} = \frac{2 \pm 2\sqrt{7}}{2} = 1 \pm \sqrt{7}$

$\therefore X \simeq 3.65$ or $X \simeq -1.65$

$\therefore$ The S.S. $= \{3.65 , -1.65\}$

[b] $\because n(X) = \frac{X(X+2)}{(X+2)(X-2)} - \frac{2(X-3)}{(X-2)(X-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2 , 2 , 3\}$

, $n(X) = \frac{X}{X-2} - \frac{2}{X-2} = \frac{X-2}{X-2} = 1$

3

[a] $\because X + y = 2$ (1) , $3X - y = 6$ (2)

Addnig (1) and (2) : $\therefore 4X = 8$ $\therefore X = 2$

Substituting in (1) : $\therefore y = 0$

$\therefore$ The S.S. $= \{(2 , 0)\}$

[b] $\because n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \div \frac{X+2}{X^2+3X+9}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , -2\}$

, $n(X) = \frac{X(X+2)}{(X-3)(X^2+3X+9)} \times \frac{X^2+3X+9}{X+2} = \frac{X}{X-3}$

4

[a] $\because X - y = 0$ $\therefore X = y$ (1)

, $2X^2 - y^2 = 9$ (2)

Substituting from (1) in (2) :

$\therefore 2X^2 - X^2 = 9$ $\therefore X^2 = 9$

$\therefore X = 3$ or $X = -3$

Substituting in (1) : $\therefore y = 3$ or $y = -3$

$\therefore$ The S.S. $= \{(3 , 3) , (-3 , -3)\}$

[b] $\because n_1(X) = \frac{2X}{2(X+4)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-4\}$ (1)

, $n_1(X) = \frac{X}{X+4}$

, $\because n_2(X) = \frac{X(X+4)}{(X+4)^2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{-4\}$ (2)

, $n_2(X) = \frac{X}{X+4}$

From (1) and (2) : $\therefore n_1 = n_2$

5

[a] [1] $\because n(X) = \frac{X(X-2)}{X-2}$ $\therefore n^{-1}(X) = \frac{X-2}{X(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 2\}$

, $n^{-1}(X) = \frac{1}{X}$

[2] $\because n^{-1}(X) = 4$ $\therefore \frac{1}{X} = 4$

$\therefore 4X = 1$ $\therefore X = \frac{1}{4}$

[b] [1] $\because$ A and B are mutually exclusive events

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B)$

$= 0.3 + 0.6 = 0.9$

[2] $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.6 - 0.2 = 0.7$

11 Kafr El-Sheikh

1

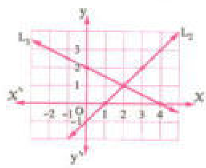
[1] b [2] d [3] c [4] b [5] a [6] b

2

[a] $X = 4 - 2y$, $y = X - 1$

X	4	2	0
y	0	1	2

X	1	2	3
y	0	1	2



From the graph : $\therefore$ The S.S. $= \{(2 , 1)\}$

[b] 1 $\because P(B) = P(\acute{B})$, $P(B) + P(\acute{B}) = 1$

$\therefore P(B) = 0.5$

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.5 - 0.2 = 0.6$

2 $P(A - B) = P(A) - P(A \cap B)$

$= 0.3 - 0.2 = 0.1$

3

[a] $\because a = 1$, $b = 2$, $c = -4$

$\therefore X = \frac{-2 \pm \sqrt{(2)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{-2 \pm 2\sqrt{5}}{2}$

$= -1 \pm \sqrt{5}$

$\therefore X \simeq 1.24$ or $X \simeq -3.24$

$\therefore$ The S.S. $= \{1.24 , -3.24\}$

[b] $\because X + y = 3$ $\qquad \therefore y = 3 - X$ (1)

$, X^2 + y^2 = 5$ (2)

Substituting from (1) in (2) :

$\therefore X^2 + (3 - X)^2 = 5$

$\therefore X^2 + 9 - 6X + X^2 - 5 = 0$

$\therefore 2X^2 - 6X + 4 = 0$ $\qquad \therefore X^2 - 3X + 2 = 0$

$\therefore (X - 1)(X - 2) = 0$ $\qquad \therefore X = 1$ or $X = 2$

Substituting in (1) : $\therefore y = 2$ or $y = 1$

$\therefore$ The S.S. $= \{(1 , 2) , (2 , 1)\}$

4

[a] $\because n_1(X) = \frac{2X}{2(X + 4)}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{-4\} \\ , n_1(X) = \frac{X}{X + 4} \end{array}\right\}$ (1)

$, \because n_2(X) = \frac{X(X + 4)}{(X + 4)^2}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_2 = \mathbb{R} - \{-4\} \\ , n_2(X) = \frac{X}{X + 4} \end{array}\right\}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

[b] $\because n(X) = \frac{X^2 - 3X + 9}{(X + 3)(X^2 - 3X + 9)} + \frac{(X - 2)(X + 2)}{(X - 2)(X + 3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-3 , 2\}$

$, n(X) = \frac{1}{X + 3} + \frac{X + 2}{X + 3} = \frac{X + 3}{X + 3} = 1$

5

[a] $\because n(X) = \frac{X(X - 2)}{X^2 - 2X + 2}$ $\qquad \therefore n^{-1}(X) = \frac{X^2 - 2X + 2}{X(X - 2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 2\}$

[b] $\because$ The domain of $n = \mathbb{R} - \{0 , 3\}$

$\therefore$ At $X = 3$ $\qquad \therefore X + b = 0$

$\therefore 3 + b = 0$ $\qquad \therefore b = -3$

$, \because n(-1) = 5$ $\qquad \therefore \frac{a}{-1} + \frac{4}{-1 - 3} = 5$

$\therefore -a - 1 = 5$ $\qquad \therefore a = -6$

12 El-Fayoum

1

1 a $\quad$ 2 c $\quad$ 3 d $\quad$ 4 b $\quad$ 5 a $\quad$ 6 b

2

[a] $\because a = 3$, $b = -5$, $c = 1$

$\therefore X = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$

$\therefore X \simeq 1.43$ or $X \simeq 0.23$

$\therefore$ The S.S. $= \{1.43 , 0.23\}$

[b] $\because n(X) = \frac{X(X + 2)}{(X - 2)(X^2 + 2X + 4)} \times \frac{X^2 + 2X + 4}{X + 2}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -2\}$

$, n(X) = \frac{X}{X - 2}$

3

[a] $\because X - y = 4$ (multiplying by 2)

$\therefore 2X - 2y = 8$ (1)

$, \because 3X + 2y = 7$ (2)

Adding (1) and (2) : $\therefore 5X = 15$ $\qquad \therefore X = 3$

Substituting in (1) : $\therefore y = -1$

$\therefore$ The S.S. $= \{(3 , -1)\}$

[b] $\because n_1(X) = \frac{2X}{2(X + 2)}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \\ , n_1(X) = \frac{X}{X + 2} \end{array}\right\}$ (1)

$, \because n_2(X) = \frac{X(X + 2)}{(X + 2)^2}$

$\left.\begin{array}{l} \therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\} \\ , n_2(X) = \frac{X}{X + 2} \end{array}\right\}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

4

[a] $\because X - y = 1$ $\therefore X = y + 1$ (1)

, $X^2 + y^2 = 25$ (2)

Substituting from (1) in (2) :

$\therefore (y+1)^2 + y^2 = 25$

$\therefore y^2 + 2y + 1 + y^2 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0$ $\therefore y^2 + y - 12 = 0$

$\therefore (y-3)(y+4) = 0$ $\therefore y = 3$ or $y = -4$

Substituting in (1) : $\therefore X = 4$ or $X = -3$

$\therefore$ The S.S. $= \{(4 , 3) , (-3 , -4)\}$

[b] 1 $\because n(X) = \frac{X(X-2)}{(X-2)(X-1)}$

$\therefore n^{-1}(X) = \frac{(X-2)(X-1)}{X(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 2 , 1\}$

, $n^{-1}(X) = \frac{X-1}{X}$

2 $n^{-1}(2)$ is undefined because $2 \notin$ the domain of n^{-1}

5

[a] $\because n(X) = \frac{X(X+2)}{(X+2)(X-2)} + \frac{X-3}{(X-2)(X-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2 , 2 , 3\}$

, $n(X) = \frac{X}{X-2} + \frac{1}{X-2} = \frac{X+1}{X-2}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= 0.8 + 0.7 - 0.6 = 0.9$

2 The probability of non occurrence of A
$= P(\acute{A}) = 1 - P(A) = 1 - 0.8 = 0.2$

13 Souhag

1

1 d 2 d 3 b 4 d 5 a 6 c

2

[a] $\because y = X + 1$ (1) , $2X + y = 19$ (2)

Substituting from (1) in (2) :

$\therefore 2X + X + 1 = 19$ $\therefore 3X = 18$ $\therefore X = 6$

Substituting in (1) : $\therefore y = 7$

$\therefore$ The S.S. $= \{(6 , 7)\}$

[b] $\because n(y) = \frac{(y-3)(y+3)}{3y(y+3)} \div \frac{y(y^2+1)}{y^2+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{0 , -3\}$

, $n(y) = \frac{y-3}{3y} \times \frac{1}{y} = \frac{y-3}{3y^2}$

3

[a] $\because$ The domain of $f = \mathbb{R} - \{0 , -5 , 5\}$

$\therefore$ At $X = 5$ $\therefore X^2 - a = 0$ $\therefore 5^2 - a = 0$

$\therefore 25 - a = 0$ $\therefore a = 25$

$\therefore f(X) = \frac{X+5}{X^2-25} - \frac{1}{X} = \frac{X+5}{(X+5)(X-5)} - \frac{1}{X}$

$= \frac{1}{X-5} - \frac{1}{X} = \frac{X - X + 5}{X(X-5)} = \frac{5}{X(X-5)}$

$\therefore f(-1) = \frac{5}{(-1)(-1-5)} = \frac{5}{6}$

[b] $\because a = 2$, $b = 3$, $c = 1$

$\therefore X = \frac{-3 \pm \sqrt{(3)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{-3 \pm \sqrt{1}}{4} = \frac{-3 \pm 1}{4}$

$\therefore X = \frac{-3+1}{4} = \frac{-1}{2}$ or $X = \frac{-3-1}{4} = -1$

$\therefore$ The S.S. $= \left\{-\frac{1}{2} , -1\right\}$

4

[a] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= 0.7 + 0.6 - 0.5 = 0.8$

2 $P(S) = 1$

[b] $\because X + y = 5$ $\therefore y = 5 - X$ (1)

, $2X^2 + Xy = 14$ (2)

Substituting from (1) in (2) :

$\therefore 2X^2 + X(5 - X) = 14$

$\therefore 2X^2 + 5X - X^2 - 14 = 0$ $\therefore X^2 + 5X - 14 = 0$

$\therefore (X-2)(X+7) = 0$ $\therefore X = 2$ or $X = -7$

Substituting in (1) : $\therefore y = 3$ or $y = 12$

$\therefore$ The S.S. $= \{(2 , 3) , (-7 , 12)\}$

5

[a] $\because n(X) = \frac{(X-2)(X-3)}{(X-2)^2} \div X(X-3)$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , 0 , 3\}$

, $n(X) = \frac{X-3}{X-2} \times \frac{1}{X(X-3)} = \frac{1}{X(X-2)}$

, $n(3)$ is undefined because $3 \notin$ the domain of n

[b] $\because n_1(X) = \dfrac{X^2+5X+25}{(X-5)(X^2+5X+25)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{5\} \\ , n_1(X) = \dfrac{1}{X-5}\end{array}\right\}(1)$

$, \because n_2(X) = \dfrac{X-5}{(X-5)(X+5)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{5 , -5\} \\ , n_2(X) = \dfrac{1}{X+5}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 \neq n_2$

because the domain of $n_1 \neq$ the domain of n_2

$, n_1(X) \neq n_2(X)$

14 Aswan

1

1 d 2 a 3 d 4 c 5 c 6 a

2

[a] $\because y = X + 4$ (1) $, X + y = 4$ (2)

Substituting from (1) in (2) :

$\therefore X + X + 4 = 4$ $\therefore 2X + 4 = 4$

$\therefore 2X = 0$ $\therefore X = 0$

Substituting in (1) : $\therefore y = 4$

$\therefore$ The S.S. $= \{(0 , 4)\}$

[b] $\because n_1(X) = \dfrac{X^2}{X^2(X-1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{0 , 1\} \\ , n_1(X) = \dfrac{1}{X-1}\end{array}\right\}(1)$

$, \because n_2(X) = \dfrac{X(X^2+X+1)}{X(X-1)(X^2+X+1)}$

$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{0 , 1\} \\ , n_2(X) = \dfrac{1}{X-1}\end{array}\right\}(2)$

From (1) and (2) : $\therefore n_1 = n_2$

3

[a] $\because n(X) = \dfrac{X(X+2)}{(X+2)(X-2)} + \dfrac{X-3}{(X-2)(X-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2 , 2 , 3\}$

$, n(X) = \dfrac{X}{X-2} + \dfrac{1}{X-2} = \dfrac{X+1}{X-2}$

[b] $\because X - y = 0$ $\therefore X = y$ (1)

$, X^2 + Xy + y^2 = 27$ (2)

Substituting from (1) in (2) :

$\therefore y^2 + y^2 + y^2 = 27$ $\therefore 3y^2 = 27$

$\therefore y^2 = 9$ $\therefore y = 3$ or $y = -3$

Substituting in (1) : $\therefore X = 3$ or $X = -3$

$\therefore$ The S.S. $= \{(3 , 3) , (-3 , -3)\}$

4

[a] $\because a = 2$, $b = -5$, $c = 1$

$\therefore X = \dfrac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 1}}{2 \times 2} = \dfrac{5 \pm \sqrt{17}}{4}$

$\therefore X \simeq 2.3$ or $X \simeq 0.2$

$\therefore$ The S.S. $= \{2.3 , 0.2\}$

[b] 1 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{2} + \frac{1}{3} - \frac{1}{8} = \frac{17}{24}$

2 $\because$ A and B are two mutually exclusive events

$\therefore P(A \cap B) = 0$

$\therefore P(A \cup B) = P(A) + P(B) = \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

5

[a] $\because n(X) = \dfrac{X(X-2)}{(X-2)(X^2+2)}$

$\therefore n^{-1}(X) = \dfrac{(X-2)(X^2+2)}{X(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0 , 2\}$

$, n^{-1}(X) = \dfrac{X^2+2}{X}$

[b] $\because n(X) = \dfrac{(X-1)(X^2+X+1)}{(X-1)^2} \times \dfrac{2(X-1)}{X^2+X+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

$, n(X) = 2$

15 North Sinai

1

1 b 2 c 3 c 4 b 5 d 6 a

2

[a] $\because a = 1$, $b = -5$, $c = 2$

$\therefore X = \dfrac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 2}}{2 \times 1} = \dfrac{5 \pm \sqrt{17}}{2}$

$\therefore X \simeq 4.56$ or $X \simeq 0.44$

$\therefore$ The S.S. $= \{4.56 , 0.44\}$

[b] $\because n(X) = \frac{(X+2)(X-3)}{(X+2)(X-2)} \times \frac{X(X-2)}{X-3}$

$\therefore$ The domain of $n = \mathbb{R} - \{-2, 2, 3\}$

, $n(X) = X$

3

[a] $\because X - y = 1$ (1) , $2X + y = 8$ (2)

Adding (1) and (2) : $\therefore 3X = 9$ $\therefore X = 3$

Substituting in (1) : $\therefore y = 2$

$\therefore$ The S.S. $= \{(3, 2)\}$

[b] $\because n(X) = \frac{X^2 + 2X + 4}{(X-2)(X^2+2X+4)} + \frac{(X-3)(X+1)}{(X-2)(X-3)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2, 3\}$

, $n(X) = \frac{1}{X-2} + \frac{X+1}{X-2} = \frac{X+2}{X-2}$

4

[a] $\because X - y = 2$ $\therefore X = 2 + y$ (1)

, $X^2 + y^2 = 34$ (2)

Substituting from (1) in (2) :

$\therefore (2+y)^2 + y^2 = 34$

$\therefore 4 + 4y + y^2 + y^2 - 34 = 0$

$\therefore 2y^2 + 4y - 30 = 0$ $\therefore y^2 + 2y - 15 = 0$

$\therefore (y-3)(y+5) = 0$ $\therefore y = 3$ or $y = -5$

Substituting in (1) : $\therefore X = 5$ or $X = -3$

$\therefore$ The S.S. $= \{(5, 3), (-3, -5)\}$

[b] $\because n_1(X) = \frac{3X}{3(X+3)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{-3\}$

, $n_1(X) = \frac{X}{X+3}$ (1)

, $\because n_2(X) = \frac{X(X+3)}{(X+3)^2}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{-3\}$

, $n_2(X) = \frac{X}{X+3}$ (2)

From (1) and (2) : $\therefore n_1 = n_2$

5

[a] $\because n(X) = \frac{X(X-5)}{(X-1)(X-5)}$

$\therefore n^{-1}(X) = \frac{(X-1)(X-5)}{X(X-5)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{0, 5, 1\}$

, $n^{-1}(X) = \frac{X-1}{X}$

[b] 1 $\because P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.4 + 0.7 - 0.8 = 0.3$

2 $P(A - B) = P(A) - P(A \cap B)$

$= 0.4 - 0.3 = 0.1$

Answers of examinations on Port said specifications of algebra & probability

Exam 1 Port Said

First Answers of multiple choice questions

1 (a)	2 (c)	3 (b)	4 (b)	5 (c)
6 (d)	7 (c)	8 (d)	9 (c)	10 (a)
11 (b)	12 (b)	13 (a)	14 (c)	15 (b)
16 (d)	17 (a)	18 (b)	19 (d)	20 (d)
21 (b)				

Second Answers of essay questions

22

$\because X = 3$ (1) , $X y = 6$ (2)

Substituting from (1) in (2) :

$\therefore 3 y = 6$ $\therefore y = 2$

$\therefore$ The S.S. $= \{(3 , 2)\}$

23

$\because n(X) = \frac{X-3}{(X-3)(X-4)} + \frac{X-5}{X-4}$

$\therefore$ The domain of $n = \mathbb{R} - \{3 , 4\}$

$, n(X) = \frac{1}{X-4} + \frac{X-5}{X-4} = \frac{X-4}{X-4} = 1$

24

$\because n(X) = \frac{(X-3)(X-2)}{(X-3)(X+3)}$

$\therefore n^{-1}(X) = \frac{(X-3)(X+3)}{(X-3)(X-2)}$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{2 , 3 , -3\}$

$, n^{-1}(X) = \frac{X+3}{X-2}$

Exam 2

First Answers of multiple choice questions

1 (a)	2 (c)	3 (a)	4 (d)	5 (b)
6 (b)	7 (b)	8 (a)	9 (a)	10 (c)
11 (a)	12 (c)	13 (a)	14 (d)	15 (b)
16 (a)	17 (c)	18 (a)	19 (c)	20 (c)
21 (b)				

Second Answers of essay questions

22

$\because (3 , -1)$ is a solution for the equation

$a X + b y - 5 = 0$

$\therefore 3 a - b = 5$ (1)

$\because (3 , -1)$ is a solution for the equation

$3 a X + b y = 17$

$\therefore 9 a - b = 17$

$\therefore -9 a + b = -17$ (2)

Adding (1) and (2) : $\therefore -6 a = -12$

$\therefore a = 2$

Substituting in (1) : $\therefore b = 1$

23

$\because n_1(X) = \frac{2X}{2(X+4)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_1 = \mathbb{R} - \{-4\} \\ , n_1(X) = \frac{X}{X+4}\end{array}\right\} (1)$$

$\because n_2(X) = \frac{X(X+4)}{(X+4)(X+4)}$

$$\left.\begin{array}{l}\therefore \text{The domain of } n_2 = \mathbb{R} - \{-4\} \\ , n_2(X) = \frac{X}{X+4}\end{array}\right\} (2)$$

From (1) and (2) : $\therefore n_1 = n_2$

24

$\because$ The domain of $n = \mathbb{R} - \{3\}$

$\therefore$ At $X = 3$ $\therefore X^2 - a X + 9 = 0$

$\therefore 9 - 3 a + 9 = 0$ $\therefore 18 - 3 a = 0$

$\therefore 3 a = 18$ $\therefore a = 6$

Exam 3

First Answers of multiple choice questions

1 (d)	2 (c)	3 (c)	4 (d)	5 (a)
6 (a)	7 (c)	8 (b)	9 (b)	10 (d)
11 (d)	12 (d)	13 (d)	14 (c)	15 (a)
16 (a)	17 (a)	18 (c)	19 (a)	20 (c)
21 (a)				

Second Answers of essay questions

22

Let the length be X cm. and the width be y cm.

$\therefore X - y = 4$ (1)

, $2(X + y) = 28$ $\therefore X + y = 14$ (2)

Adding (1) and (2) : $\therefore 2X = 18$ $\therefore X = 9$

Substituting in (1) : $\therefore y = 5$

$\therefore$ The length = 9 cm. , the width = 5 cm.

$\therefore$ The area of the rectangle $= 9 \times 5 = 45$ cm².

23

$\because n(X) = \frac{(X-1)^2}{(X-1)(X^2+X+1)} \div \frac{X-1}{X^2+X+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

, $n(X) = \frac{X-1}{X^2+X+1} \times \frac{X^2+X+1}{X-1} = 1$

24

$\because$ The domain of $n = \mathbb{R} - \{0 , 4\}$

$\therefore$ At $X = 4$ $\therefore X + a = 0$

$\therefore 4 + a = 0$ $\therefore a = -4$

$\therefore n(X) = \frac{b}{X} + \frac{9}{X-4}$, $\because n(5) = 2$

$\therefore \frac{b}{5} + \frac{9}{5-4} = 2$ $\therefore \frac{b}{5} + 9 = 2$

$\therefore \frac{b}{5} = -7$ $\therefore b = -35$

Exam 4

First Answers of multiple choice questions

1 (b)	2 (c)	3 (d)	4 (d)	5 (a)
6 (d)	7 (c)	8 (a)	9 (a)	10 (b)
11 (c)	12 (b)	13 (a)	14 (b)	15 (c)
16 (b)	17 (c)	18 (a)	19 (c)	20 (c)
21 (a)				

Second Answers of essay questions

22

$\because X - y = 1$ $\therefore X = 1 + y$ (1)

Substituting in the second equation :

$\therefore (1+y)^2 + y^2 = 25$ $\therefore 1 + 2y + y^2 + y^2 - 25 = 0$

$\therefore 2y^2 + 2y - 24 = 0$ $\therefore y^2 + y - 12 = 0$

$\therefore (y+4)(y-3) = 0$ $\therefore y = -4$ or $y = 3$

Substituting in (1) : $\therefore X = -3$ or $X = 4$

$\therefore$ The S.S. $= \{(-3 , -4) , (4 , 3)\}$

23

$\because n_1(X) = \frac{(X-2)(X+2)}{(X-2)(X+3)}$

$\therefore$ The domain of $n_1 = \mathbb{R} - \{2 , -3\}$

, $n_1(X) = \frac{X+2}{X+3}$

, $\because n_2(X) = \frac{X(X-3)(X+2)}{X(X-3)(X+3)}$

$\therefore$ The domain of $n_2 = \mathbb{R} - \{0 , 3 , -3\}$

, $n_2(X) = \frac{X+2}{X+3}$

$\therefore n_1(X) = n_2(X)$ for all the values of

$X \in \mathbb{R} - \{0 , 2 , 3 , -3\}$

24

$\because n(X) = \frac{X^2+2X+4}{(X-2)(X^2+2X+4)} + \frac{(X+3)(X-3)}{(X+3)(X-2)}$

$\therefore$ The domain of $n = \mathbb{R} - \{2 , -3\}$

, $n(X) = \frac{1}{X-2} + \frac{X-3}{X-2} = \frac{X-2}{X-2} = 1$

Exam 5

First Answers of multiple choice questions

1 (a)	2 (c)	3 (a)	4 (a)	5 (d)
6 (b)	7 (a)	8 (c)	9 (d)	10 (d)
11 (c)	12 (d)	13 (c)	14 (b)	15 (d)
16 (b)	17 (c)	18 (c)	19 (b)	20 (a)
21 (c)				

Second Answers of essay questions

22

$\because X^2 - X - 5 = 0$

$\therefore a = 1$, $b = -1$, $c = -5$

$\therefore X = \frac{1 \pm \sqrt{(-1)^2 - 4 \times 1 \times (-5)}}{2 \times 1} = \frac{1 \pm \sqrt{21}}{2}$

$\therefore X \simeq 2.8$ or $X \simeq -1.8$

$\therefore$ The S.S. $= \{2.8 , -1.8\}$

23

$\because n(x) = \frac{(x-1)(x^2+x+1)}{(x-1)(x-1)} \times \frac{2(x-1)}{x^2+x+1}$

$\therefore$ The domain of $n = \mathbb{R} - \{1\}$

, $n(x) = 2$

24

$\because f(3) = 0$ $\therefore 9a + 3b + 15 = 0$

$\therefore 3a + b = -5$ (1)

, $\because f(5) = 0$ $\therefore 25a + 5b + 15 = 0$

$\therefore 5a + b = -3$ (2)

Subtracting (1) from (2) :

$\therefore 2a = 2$ $\therefore a = 1$

And from (1) : $\therefore b = -8$

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9